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## ***MAINTENANCE AND SERVICE GUIDE*** ***Compaq ProLiant 2500 Family of Servers***

First Edition (October 1996)  
Part Number 281834-001

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## Preface

### About This Guide

This *Maintenance and Service Guide* is a troubleshooting guide that can be used for reference when servicing the Compaq ProLiant 2500 Family of Servers. Only authorized technicians trained by Compaq should attempt to repair this equipment.

Compaq Computer Corporation reserves the right to make changes to Compaq ProLiant 2500 and 2500R Servers without notice.

Many of the illustrations used in this guide show only the Compaq ProLiant 2500. You can also refer to these illustrations when servicing the Compaq ProLiant 2500R. Separate illustrations are provided where necessary.

## Symbols

The following text and symbols mark special messages throughout this guide:



**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

---



**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of data.

---

**IMPORTANT:** Text set off in this manner presents clarifying information or specific instructions.

---

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

## Technician Notes



**WARNING:** Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indications of component replacement or printed wiring board modifications may void any warranty.

---



**CAUTION:** To properly ventilate your system, you must provide at least 12 inches (30.48 cm) of clearance at the front and back of the computer.

---



**CAUTION:** The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

---

## Locating Additional Information

The following documentation is available to support these products:

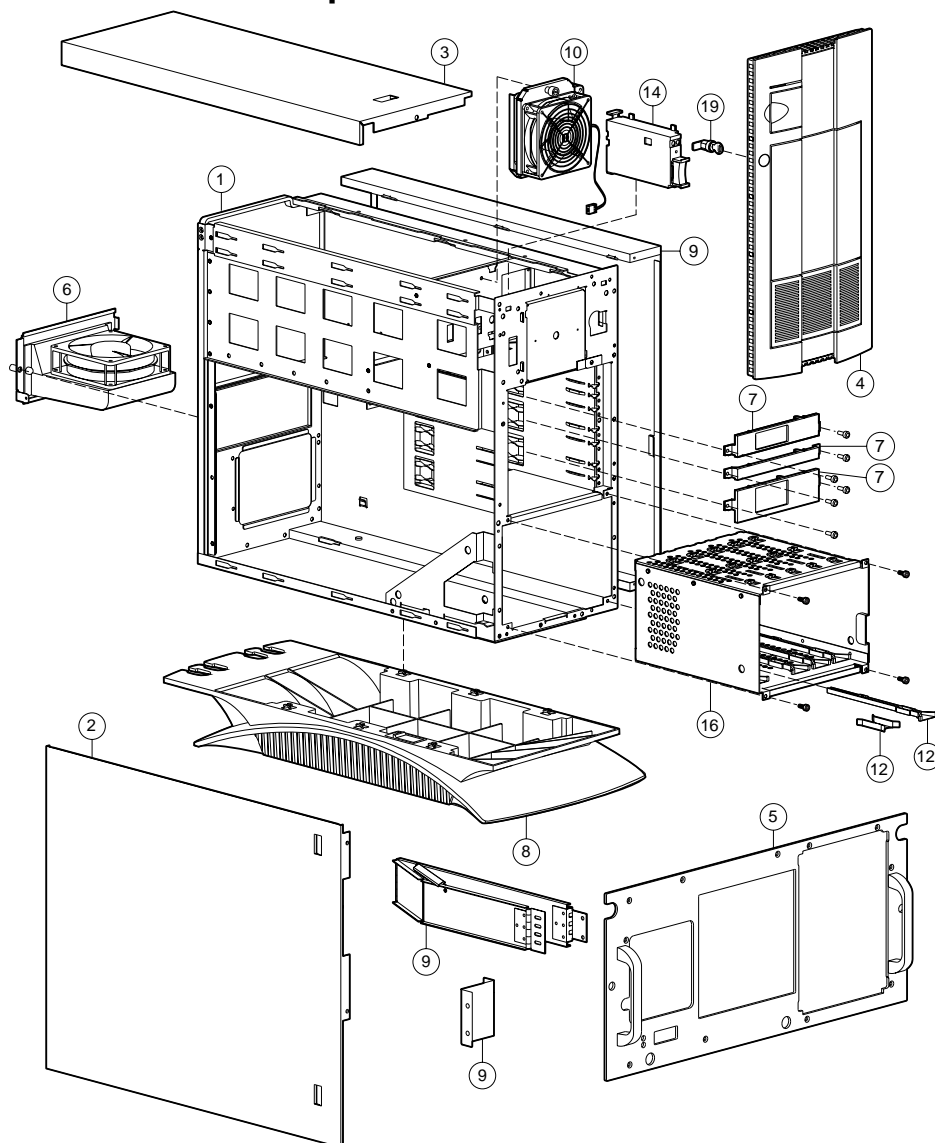
- User Documentation
- *Compaq Service Quick Reference Guide*
- Service Training Guides
- *Compaq Service Advisories and Bulletins*
- *Compaq QuickFind*
- Compaq Insight Manager

## Chapter 1

# Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and a spares parts list for the Compaq ProLiant 2500 Family of Servers.

## Mechanical Parts Exploded View



**Figure 1-1.** Exploded View of the Compaq ProLiant 2500 and 2500R Server Mechanical Parts



## System Components Exploded View

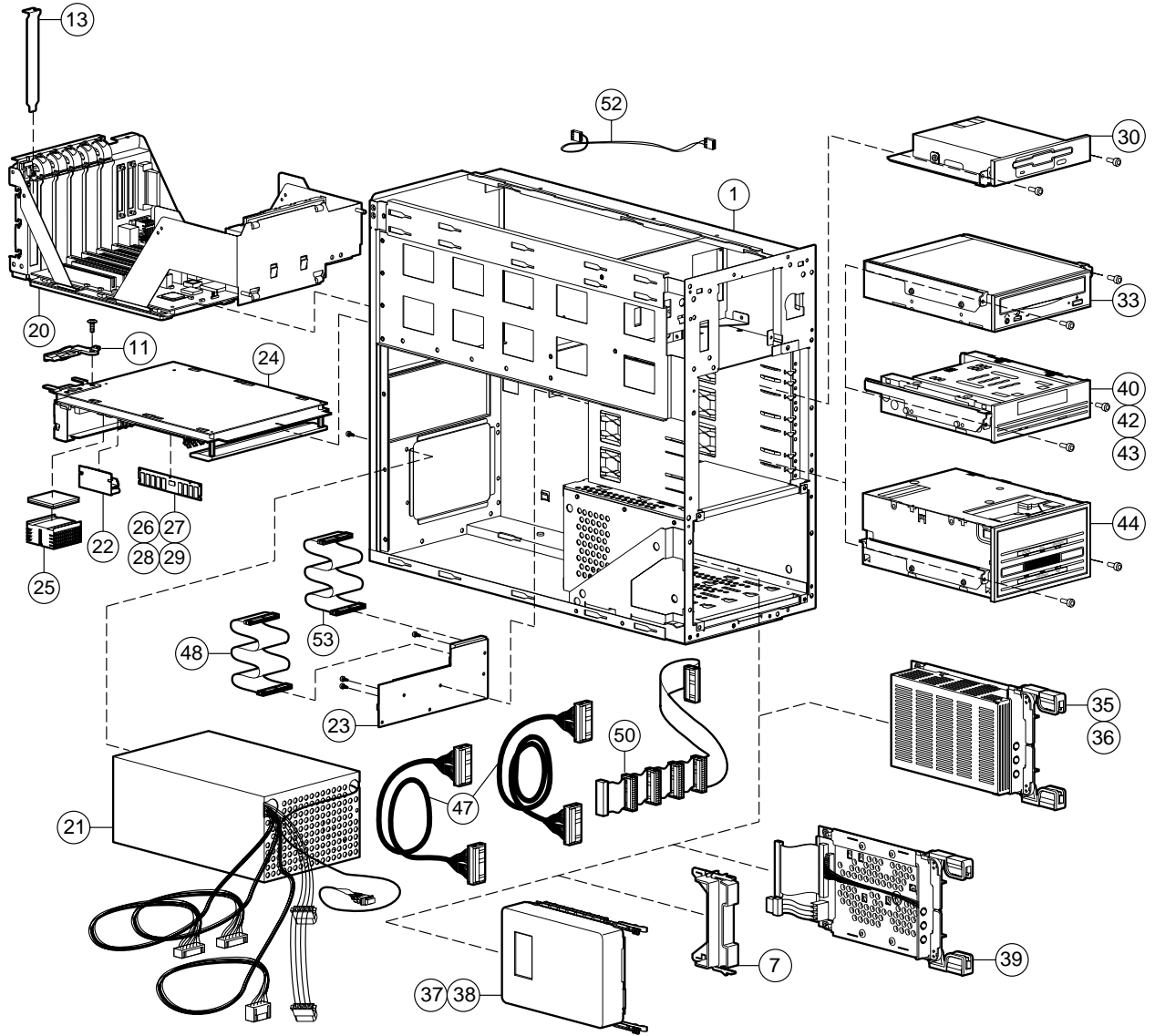


Figure 1-2. Exploded View of the Compaq ProLiant 2500 and 2500R Server System Components

## Spares Parts List

The Compaq ProLiant 2500 is a tower server. The Compaq ProLiant 2500R is a rack-mountable server. Spares that are unique to the tower or rack models are noted in Table 1-1.

**Table 1-1**  
**Spares Parts List - Compaq ProLiant 2500 and 2500R Servers**

| Item              | Description   | Spares Part # |
|-------------------|---|---------------|
| <b>CHASSIS</b>    |   |               |
| 1                 | Chassis   | 271917-001    |
| 2                 | Large Panel (Side panel in Compaq ProLiant 2500, top panel in 2500R)              | 281846-001    |
| 3                 | Small Panel (Top panel in Compaq ProLiant 2500, side panel in 2500R)              | 271926-001    |
| 4                 | Front Bezel Door (Compaq ProLiant 2500 only)                                      | 271923-001    |
| 5                 | Front Bezel (Compaq ProLiant 2500R only)  | 271924-001    |
| 6                 | Processor Fan and Cage  | 271919-001    |
| 7                 | Bezel Kit (1/6, 1/3, 1/2 Height - Qty 5 each) and Empty Hot-Pluggable Drive Cover | 189917-001    |
| 8                 | Base (Compaq ProLiant 2500 only)  | 271940-001    |
| 9                 | Base Pan/Rack Conversion Kit (Compaq ProLiant 2500R only)                         | 271927-001    |
| 10                | System I/O Fan  | 281844-001    |
| 11                | Ejector for Processor Board Tray  | 271933-001    |
| 12                | Drive Guide and Ground Spring (Qty 5 each)  | 146771-001    |
| 13                | Slot Covers, Clips (Qty 6)  | 271918-001    |
| 14                | Power Switch (Push Button)  | 271929-001    |
| 15                | Logo Kit (Qty 2)  | 250907-001 *  |
| <b>ASSEMBLIES</b> |   |               |
| 16                | Hot-Pluggable Drive Cage w/ Backplane Board (5 x 1-inch drives)                   | 250911-001    |
| 17                | Hot-Pluggable Drive Cage w/ Backplane Board (Duplexed)                            | 271932-001    |
| 18                | Non-Hot-Pluggable Drive Cage (Compaq ProLiant 2500 only)                          | 271922-001    |
| 19                | Key-Lock Assembly   | 148725-001    |
| 20                | System I/O Board Tray Assembly  | 271953-001    |

*Continued*

1-4 Illustrated Parts Catalog

**Spares Parts List - Compaq ProLiant 2500 and 2500R Servers** *Continued*

| Item                     | Description                                   | Spares Part # |
|--------------------------|---|---------------|
| <b>SYSTEM COMPONENTS</b> |   |               |
| 21                       | Power Supply                                  | 271916-001    |
| <b>BOARDS</b>            |   |               |
| 22                       | Processor Power Module                        | 271935-001    |
| 23                       | System I/O and Processor Backplane Board      | 250908-001    |
| 24                       | P6/200 MHz Board Tray                         | 271914-001    |
| 25                       | P6/200 MHz Processor Chip with Heatsink       | 271942-001    |
| <b>MEMORY</b>            |   |               |
| 26                       | 32-MB DIMM EDO/B (60ns)                       | 281857-001    |
| 27                       | 64-MB DIMM EDO/B (60ns)                       | 281858-001    |
| 28                       | 128-MB DIMM EDO/B (60ns)                      | 281859-001    |
| 29                       | 256-MB DIMM EDO/B (60ns)                      | 281860-001    |
| <b>MASS STORAGE</b>      |   |               |
| 30                       | 1.44 MB, 3.5-inch Diskette Drive (Standard)   | 144207-201    |
| 31                       | 1.44 MB, 3.5-inch Diskette Drive (Option)     | 112565-001 *  |
| 32                       | Caddy Load CD-ROM Drive                       | 133881-001 *  |
| 33                       | Tray Load Quad-Speed CD-ROM Drive             | 184783-001    |
| 34                       | 2-GB, 1-inch Fast-Wide SCSI-2 Drive           | 199878-001 *  |
| 35                       | 2.1-GB Pluggable Fast-Wide SCSI-2 Drive       | 199643-001    |
| 36                       | 4.3-GB Pluggable Fast-Wide SCSI-2 Drive       | 199598-001    |
| 37                       | 4.3-GB Non-Pluggable Fast-Wide SCSI-2 Drive   | 199599-001    |
| 38                       | 2.1-GB Non-Pluggable Fast-Wide SCSI-2         | 199644-001    |
| 39                       | Hot-Pluggable Tray Adapter (Fast-Wide SCSI-2) | 199656-001    |
| 40                       | 525-MB ACA Tape Drive                         | 142073-201    |
| 41                       | 1.2-GB Tape Drive                             | 199615-201 *  |
| 42                       | 2/8-GB DAT Drive                              | 142074-201    |
| 43                       | 4/16-GB TurboDAT Drive                        | 199464-201    |
| 44                       | 4/16-GB TurboDAT Autoloader                   | 199466-201    |
| 45                       | 10/20-GB DLT Drive                            | 199746-001 *  |
| 46                       | 15/30-GB DLT Drive                            | 242468-001 *  |

*Continued*

**Spares Parts List - Compaq ProLiant 2500 and 2500R Servers** *Continued*

| Item              | Description                           | Spares Part # |
|-------------------|---------------------------------------|---------------|
| <b>CABLE KITS</b> |                                       |               |
| 47                | Wide SCSI Cable (18-inch and 36-inch) | 271937-001    |
| 48                | Diskette Cable                        | 271928-001    |
| 49                | Diskette/CD-ROM Power Cable           | 271939-001 *  |
| 50                | SCSI Cable (non-Hot-Pluggable)        | 271954-001    |
| 51                | Power Cable (non-Hot-Pluggable)       | 250906-001    |
| 52                | Fan Cable                             | 271920-001    |
| 53                | IDE/CD-ROM Cable                      | 271936-001    |
| 54                | Parallel Cable                        | 271938-001 *  |
| <b>KEYBOARDS</b>  |                                       |               |
| 55                | Keyboard, U.S. English                | 160648-101 *  |
| 56                | Keyboard, U.K. English                | 160648-103 *  |
| 57                | Keyboard, German                      | 160648-104 *  |
| 58                | Keyboard, French                      | 160648-105 *  |
| 59                | Keyboard, Italian                     | 160648-106 *  |
| 60                | Keyboard, Spanish                     | 160648-107 *  |
| 61                | Keyboard, Danish                      | 160648-108 *  |
| 62                | Keyboard, Norwegian                   | 160648-109 *  |
| 63                | Keyboard, Swedish/Finnish             | 160648-110 *  |
| 64                | Keyboard, Swiss                       | 160648-111 *  |
| 65                | Keyboard, French Canadian             | 160648-112 *  |
| 66                | Keyboard, Portuguese                  | 160648-113 *  |
| 67                | Keyboard, Turkish                     | 160648-114 *  |
| 68                | Keyboard, Greek                       | 160648-115 *  |
| 69                | Keyboard, Latin American              | 160648-116 *  |
| 70                | Keyboard, Arabic                      | 160648-117 *  |
| 71                | Keyboard, Belgian                     | 160648-118 *  |
| 72                | Keyboard, BHCSY                       | 160648-120 *  |
| 73                | Keyboard, Hungary                     | 160648-121 *  |
| 74                | Keyboard, Polish                      | 160648-122 *  |
| 75                | Keyboard, Slovakia                    | 160648-123 *  |
| 76                | Keyboard, Russia                      | 160648-124 *  |
| 77                | Keyboard, Czech                       | 160648-129 *  |

*Continued*

**Spares Parts List - Compaq ProLiant 2500 and 2500R Servers** *Continued*

| Item                 | Description                                 | Spares Part # |
|----------------------|---|---------------|
| <b>MISCELLANEOUS</b> |   |               |
| 78                   | Miscellaneous Hardware Kit                  | 281847-001 *  |
| 79                   | System ROMpaq                               | 143198-001 *  |
| 80                   | Option ROMpaq                               | 142207-001 *  |
| 81                   | System I/O Battery                          | 160274-001 *  |
| 82                   | Compaq SmartStart CD                        | 183969-001 *  |
| 83                   | Compaq Systems Reference Library CD         | 183163-001 *  |
| <b>OPTIONS</b>       |   |               |
| 84                   | SMART Controller                            | 142130-001 *  |
|                      |   | 181132-001 *  |
| 85                   | SMART-2 /E Controller                       | 194752-001 *  |
| 86                   | SMART-2 /P Controller                       | 194754-001 *  |
| 87                   | Fast-SCSI-2/E Controller                    | 142040-001 *  |
| 88                   | 32-Bit Fast-Wide SCSI-2/E Controller        | 199634-001 *  |
| 89                   | 32-Bit Fast-Wide SCSI-2/P Controller        | 199633-001 *  |
| 90                   | NetFlex Controller                          | 142041-001 *  |
| 91                   | NetFlex Controller Token Ring Module        | 142042-001 *  |
| 92                   | NetFlex-2 Ethernet/Token Ring Controller    | 142222-001 *  |
| 93                   | NetFlex-2 DualPort Ethernet Controller      | 142151-001 *  |
| 94                   | NetFlex-2 Token Ring Controller             | 199521-001 *  |
| 95                   | NetFlex-2 DualPort Token Ring Controller    | 142195-001 *  |
| 96                   | NetFlex-3/E Controller                      | 169801-001 *  |
| 97                   | NetFlex-3/P Controller                      | 169811-001 *  |
| 98                   | NetFlex-3 100 Base-TX Upgrade Module        | 169805-001 *  |
| 99                   | NetFlex-3 100 VG-AnyLAN Upgrade Module      | 169803-001 *  |
| 100                  | 10/100 TX PCI UTP Controller                | 169849-001 *  |
| 101                  | 10 T, PCI UTP Controller                    | 242501-001 *  |
| 102                  | 4/16 TR PCI IBM UTP/STP Controller          | 199764-001 *  |
| 103                  | 50-Pin to 68-Pin Adapter (Standard to Wide) | 189638-001 *  |
| 104                  | 68-Pin to 50-Pin Adapter (Wide to Standard) | 189631-001 *  |
| 105                  | NIC 10/100 Class B                          | 219414-001 *  |
| * Not Shown          |   |               |

## Chapter 2

# Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the Compaq ProLiant 2500 and Compaq ProLiant 2500R Servers. After completing all necessary removal and replacement procedures, run the DIAGNOSTICS program to verify that all components operate properly.

To service Compaq ProLiant 2500 and 2500R Servers, you might need:

- Torx T-15 screwdriver
- From the Compaq SmartStart and Support Software CD:
  - System Configuration Utility software
  - Drive Array Advanced Diagnostics software
  - Diagnostics software

The Compaq ProLiant 2500 is a tower server. The Compaq ProLiant 2500R is a rack-mountable server. The models are identical except for their orientation: on the tower model, the chassis is upright; on the the rack-mountable model, the chassis is on its side.

## Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover work stations with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep work area free of non-conductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads or circuitry.
- Always place drives PCB assembly side down on the foam.
- Use conductive field service tools.

## Symbols in Equipment



**WARNING:** Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists. To avoid risk of injury from a hot component, allow the surface to cool before touching.

---



**WARNING:** Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts. To avoid risk of injury from electrical shock hazards, do not open this enclosure.

---



**WARNING:** Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection. To avoid risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

---

## Preparation Procedures

Before beginning any of the removal and replacement procedures, complete the following steps:

1. Turn OFF the server and any peripheral devices.
2. Disconnect the AC power cord from the AC outlet, then from the server.
3. Disconnect all external peripheral devices from the server.

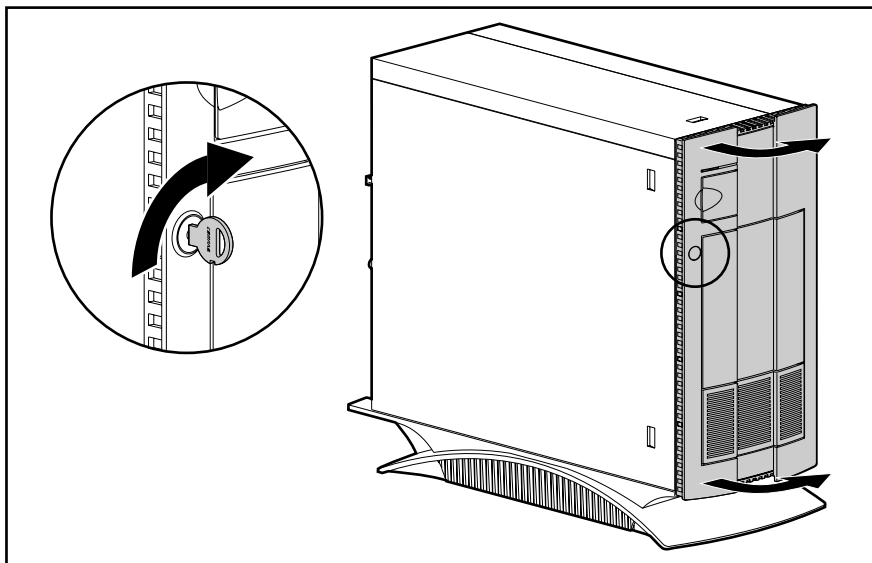
## Front Bezel

On the Compaq ProLiant 2500 Server, the front bezel is a door. On the Compaq ProLiant 2500R Server, the front bezel is a plate.

### Compaq ProLiant 2500



**WARNING:** High voltage present. Extreme care must be taken when running the Compaq ProLiant 2500 Server without the system unit cover on.



**Figure 2-1.** Opening Front Bezel Door

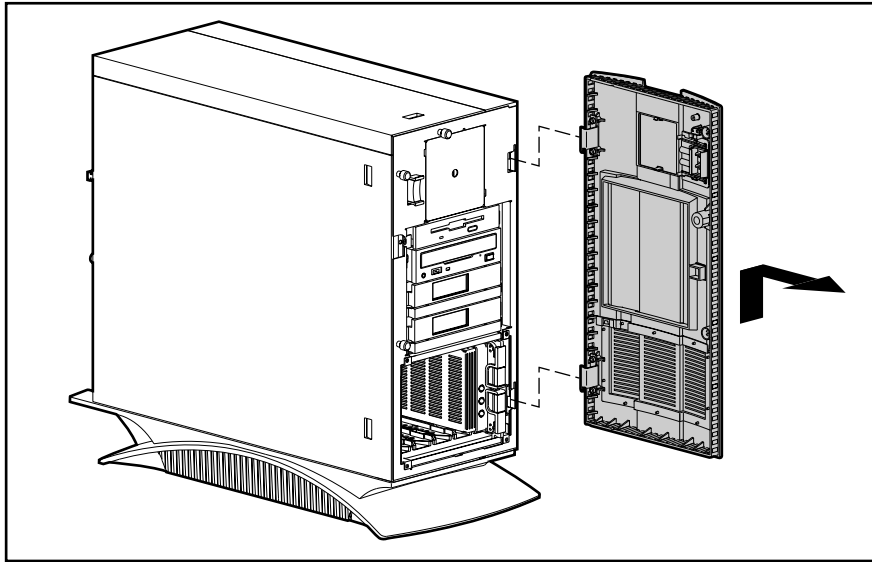
1. Unlock the front bezel and swing open the door.



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## 2-4 Removal and Replacement Procedures




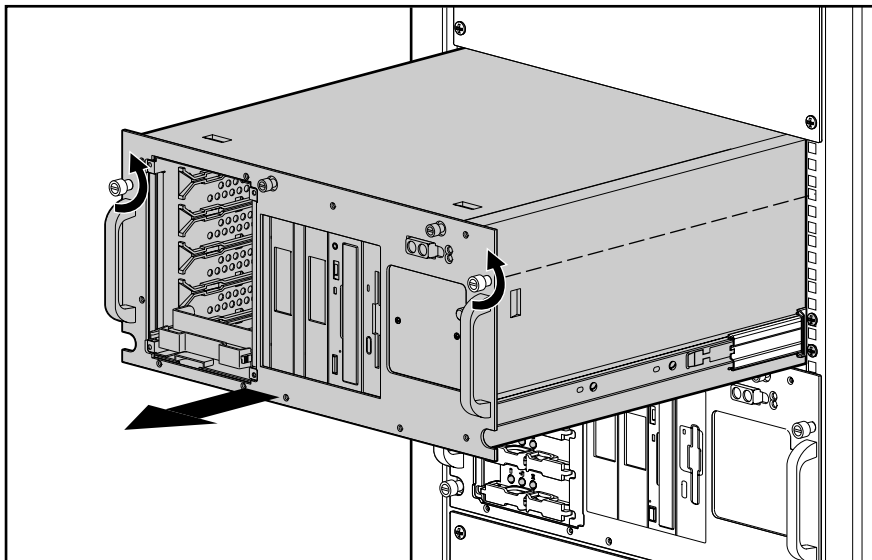
**Figure 2-2.**Removing the Front Bezel Door

2. Lift and remove the door.

Reverse steps 1 to 2 to replace the front bezel door.

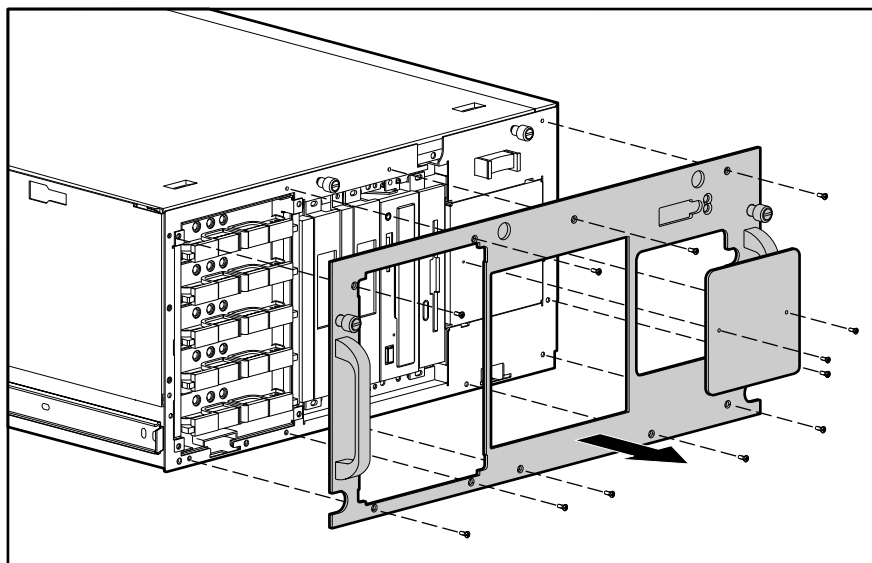
## Compaq ProLiant 2500R

 **WARNING:** High voltage present. Extreme care must be taken when running the Compaq ProLiant 2500R Server without the system unit cover on.



**Figure 2-3.** Extending the Server from the Rack

1. Unscrew the front panel thumb screws to release the server from the rack.
2. Using the handles, pull the server out from the rack to the locked position.



**Figure 2-4.** Removing Front Bezel

.....

.....

## 2-6 Removal and Replacement Procedures

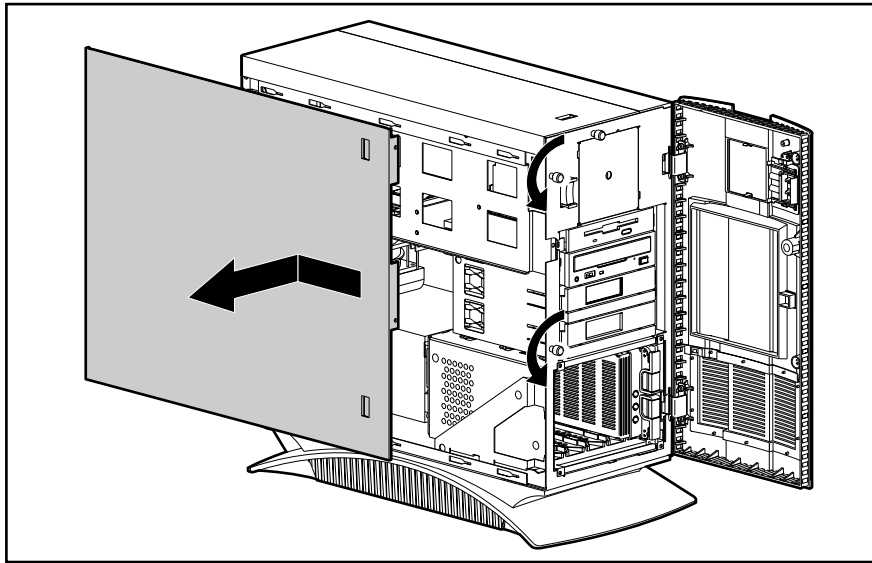
3. Remove the screws from the front bezel panel and remove it.

Reverse steps 1 to 3 to replace the front bezel.

## Large Access Panel

On the Compaq ProLiant 2500 Server, the large access panel is the side panel. On the Compaq ProLiant 2500R Server, the large access panel is the top panel.

### Compaq ProLiant 2500



**Figure 2-5.** Removing the Large Access Panel from the Compaq ProLiant 2500

1. Unlock and open the front bezel door.
2. Loosen the thumb screws on the front panel.
3. Slide the large access panel toward the rear of the unit 0.5 inch (1.5 cm).
4. Lift and remove the large access panel.



**CAUTION:** Do not operate the server with the large access panel removed. The large access panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

Reverse steps 1 to 4 to replace the large access panel.

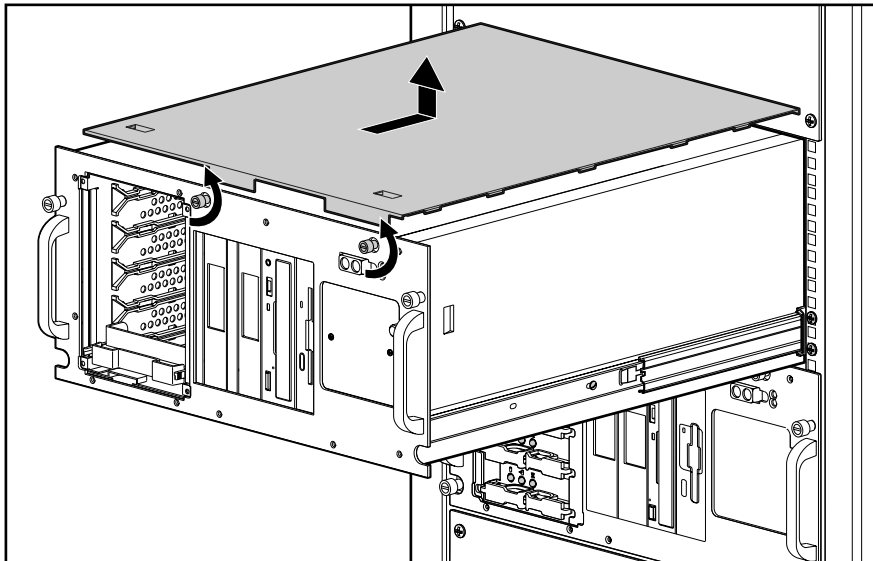
---

## Compaq ProLiant 2500R



**WARNING:** High voltage present. Extreme care must be taken when running the Compaq ProLiant 2500R Server without the system unit cover on.

1. Unscrew the front panel thumb screws to release the server from the rack.
2. Using the handles, pull the server out from the rack to the locked position.



**Figure 2-6.** Removing the Large Access Panel from the Compaq ProLiant 2500R

3. Turn the two thumbscrews screws on the front bezel.
4. Slide the large access panel toward the rear of the unit 0.5 inch (1.5 cm).
5. Lift and remove the large access panel.

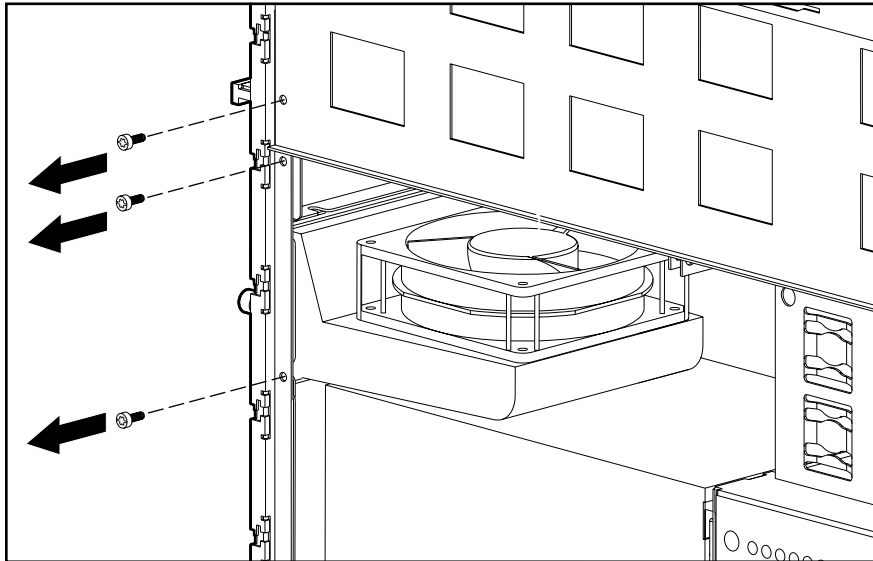


**CAUTION:** Do not operate the server with the large access panel removed. The large access panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

Reverse steps 1 to 5 to replace the large access panel.

## Security Screws

If security screws are in place, you must remove them before you can remove the system I/O board tray assembly, the processor tray assembly, or the system I/O fan.



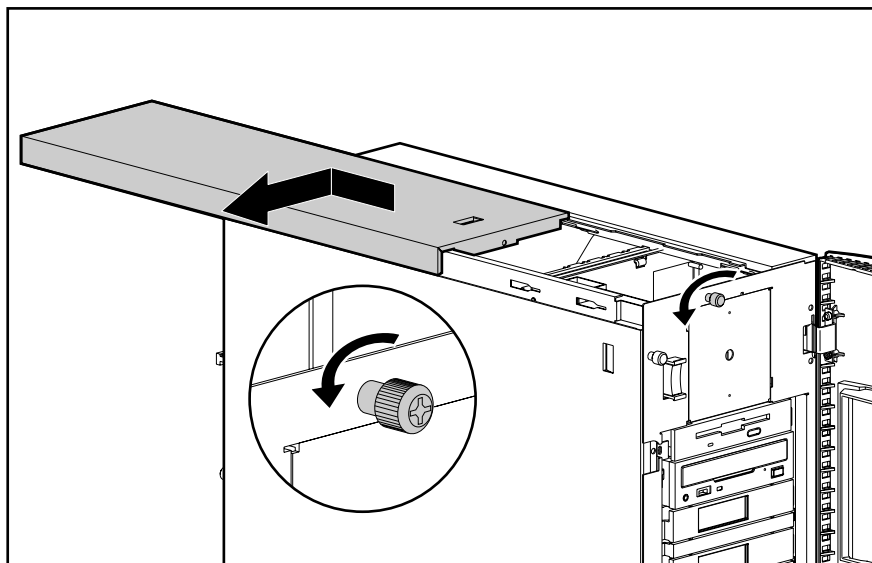
**Figure 2-7.**Removing Three Security Screws

1. If the computer is ON, turn it OFF and disconnect the power cord.
  2. Disconnect any other external equipment connected to the computer.
  3. Remove the large access panel.
  4. Remove the security screws.
-

## Small Access Panel

On the Compaq ProLiant 2500, the small access panel is the top panel. On the Compaq ProLiant 2500R, it is the side panel.

### Compaq ProLiant 2500



**Figure 2-8.** Removing the Small Access Panel from the Compaq ProLiant 2500

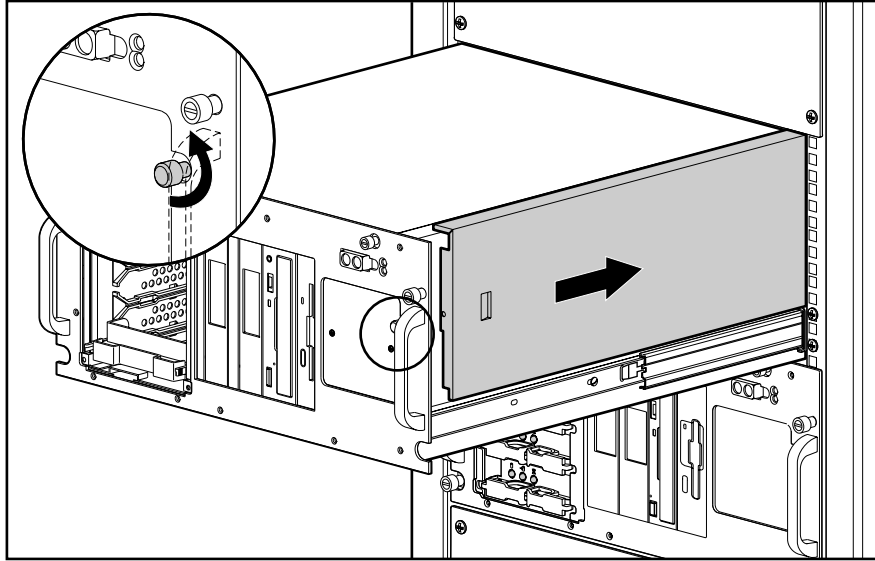
1. Open the front bezel door.
2. Loosen the side thumb screw on the front panel.
3. Slide the panel toward the rear of the unit about 0.5 inch (1.5 cm) and then slide the panel to the side of the server.
4. Lift and remove the small access panel.



**CAUTION:** Do not operate the server with the small access panel removed. The small access panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

Reverse steps 1 to 4 to replace the small access panel.

## Compaq ProLiant 2500R



**Figure 2-9.** Removing the Small Access Panel from the Compaq ProLiant 2500R

1. Pull the server out from the rack to the locked position.
2. Loosen the top thumb screw on the front panel.
3. Slide the panel toward the rear of the unit about 0.5 inch (1.5 cm) and then slide the panel to the side of the server.
4. Lift and remove the small access panel.



**CAUTION:** Do not operate the server with the small access panel removed. The small access panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

---

Reverse steps 1 to 4 to replace the small access panel.

## Mass Storage Devices

The Compaq ProLiant 2500 Server contains two areas for mass storage devices: the removable media area and the hot-pluggable or non-hot-pluggable hard drive cage.

Hot-pluggable models contain a maximum of seven, eight, or nine drive bays depending on the drive cage option: four in the removable media area, and three, four, or five in the hot-pluggable hard drive bays.

Non-hot-pluggable models of the Compaq ProLiant 2500 contain a maximum of eight non-hot-pluggable drive bays: four in the removable media area, and four in the non-hot-pluggable hard drive bays.

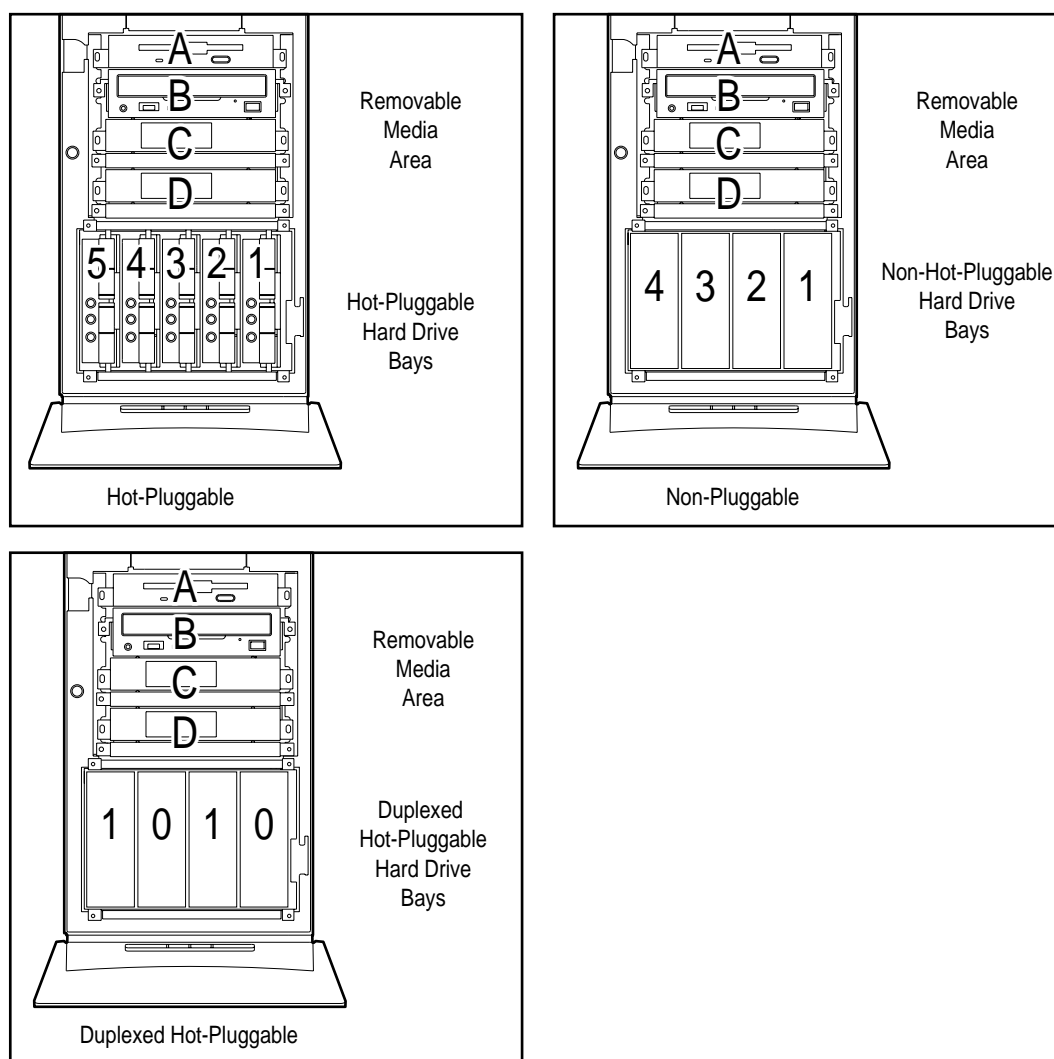


Figure 2-10. Mass Storage Device Locations and Bay Numbers

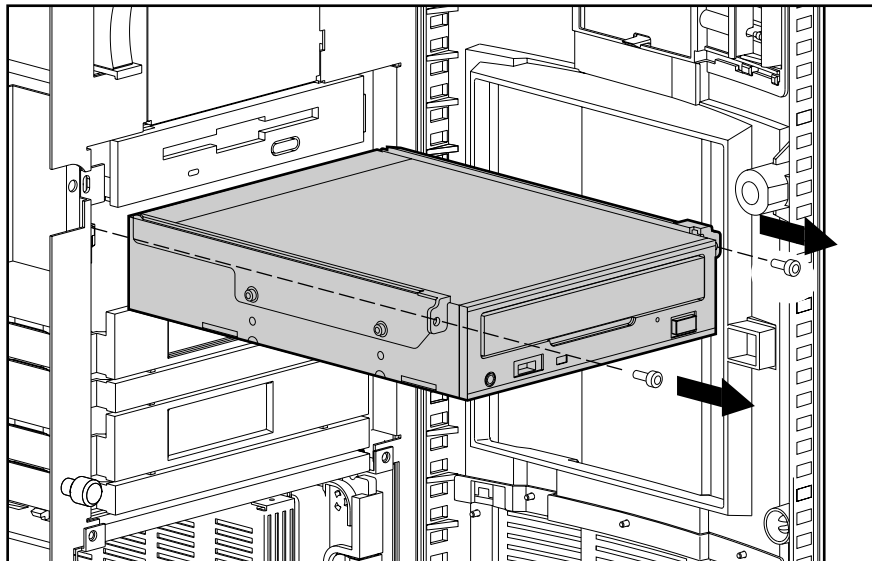


2-12 Removal and Replacement Procedures

## Removable Media Storage Devices

Table 2-1 shows the supported mass storage devices and their supported locations.

| Table 2-1<br>Removable Media Bay Configurations           |                                      |   |   |   |                      |   |   |   |
|---|--------------------------------------|---|---|---|----------------------|---|---|---|
| Mass Storage Device                                       | Storage Bays                         |   |   |   |                      |   |   |   |
|   | Non-Hot-Pluggable or Duplexed Models |   |   |   | Hot-Pluggable Models |   |   |   |
|   | 4                                    | 5 | 6 | 7 | 5                    | 6 | 7 | 8 |
| 1.44-MB, 3.5" Diskette Drive                              |                                      |   |   | ✓ |                      |   |   | ✓ |
| 1.2-MB, 5.25" Diskette Drive                              |                                      |   |   | ✓ |                      |   |   | ✓ |
| 2/8-GB DAT (Digital Audio Tape) Drive                     | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| 525-MB ACA Tape Drive                                     | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| CD-ROM Drive  |                                      |   | ✓ |   |                      |   | ✓ |   |
| 4/16-GB TurboDAT Drive                                    | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| 1.2-GB Tape Drive   | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| 4/16-GB DAT Autoloader (Requires bays 4 and 5 or 5 and 6) | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| 10/20-GB DLT Drive  | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |
| 15/30-GB DLT Drive  | ✓                                    | ✓ |   |   | ✓                    | ✓ |   |   |



**Figure 2-11.** Removing a Storage Device from the Removable Media Area

1. Remove the large access panel.
2. Disconnect the power and signal cables from the rear of the storage device.
3. Tower units - open the front bezel door  
Rack units - remove the front bezel panel, see page 2-5
4. Remove the retaining screws.
5. Slide the mass storage device out.

Reverse steps 1 to 4 to replace a mass storage device.

## Hot-Pluggable Hard Drives

Hot-pluggable hard drives used in combination with the integrated Wide-Ultra SCSI Controller can be replaced while the power is on.

**NOTE:** It is not necessary to set the SCSI ID jumpers on a Compaq replacement hot-pluggable hard drive. The SCSI ID is set automatically by the backplane board and the hot-pluggable tray (to a SCSI ID matching the bay number) when the drive is installed.



**CAUTION:** Before removing any hot-pluggable hard drive, read the guidelines listed in the following section.

---

## Important Guidelines For Replacing Hot-Pluggable Hard Drives

When you replace a drive configured for fault tolerance, the replacement drive will automatically begin to be restored. When a drive is being restored, the *Online* LED will flash green. The LED will continue to flash until the drive is completely restored.

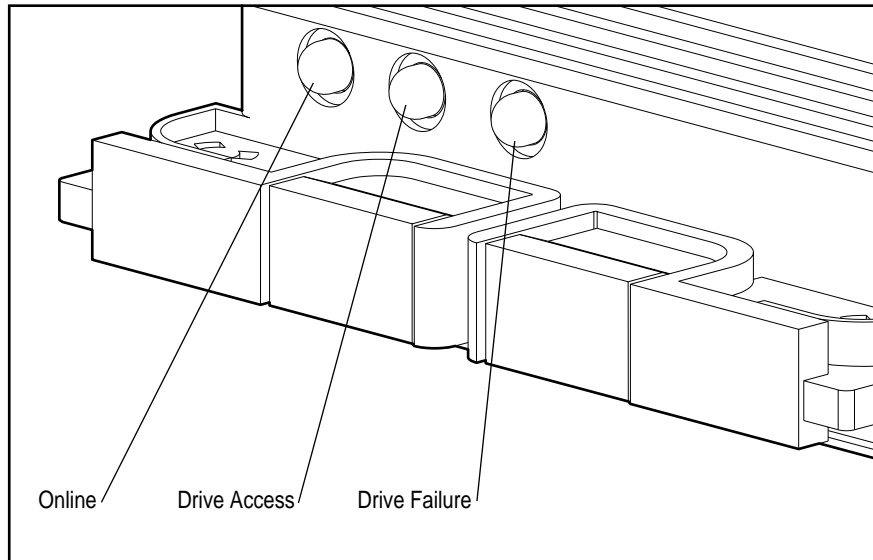


Figure 2-12. Hot-Pluggable Hard Drive LED Indicators

When replacing hot-pluggable hard drives, you must follow these guidelines:

- **Never remove more than one drive at a time.** When a drive is replaced, the controller uses data from the other drives in the array to reconstruct data on the replacement drive. If more than one drive is removed, a complete data set is not available to reconstruct data on the replacement drive(s).
- **Never remove a working drive when another drive has failed.** Drives that have been failed by the controller are indicated by the amber *Drive Failure* LED on the drive tray. Permanent data loss will occur if you remove a working drive when replacing a failed drive.
- **Never remove a drive while another drive is being rebuilt.** A drives' *Online* LED flashes green when it is being rebuilt. A replaced drive is restored from data stored on the other drives.
- **Never turn a ProLiant Storage System OFF while the server controlling it is powered ON.** Doing so will cause the server's array controller to mark the drives as "failed." This could result in permanent data loss.
- **If an online spare drive is installed, wait for it to complete rebuilding before replacing the failed drive.** When a drive fails, the online spare will become active and begin to be rebuilt as a replacement drive. After the online spare has been completely rebuilt (*Online* LED will be on solid), replace the failed drive with a new drive. **Do not** replace the failed drive with the online spare.
- **A POST error message (1786) will occur when the system is turned on if a drive(s) has been replaced while the system is OFF.** When this occurs you will be prompted to:

PRESS F1 TO BOOT THE SYSTEM AND REBUILD THE REPLACED DRIVE, OR

PRESS F2 TO BOOT THE SYSTEM AND NOT REBUILD THE DRIVE(S).

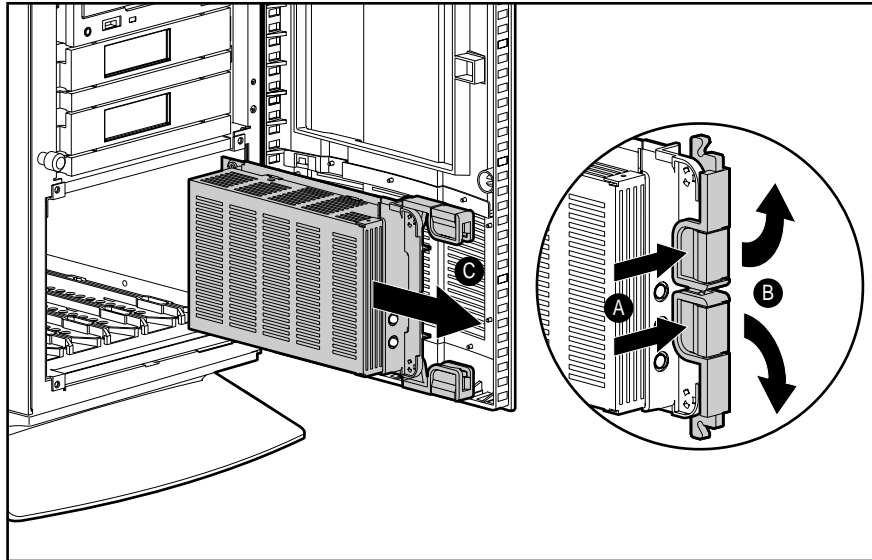


**CAUTION:** Pressing F2 will cause permanent data loss to the entire logical drive. Press F2 only if all of the drives have been replaced or if complete data loss is desired.

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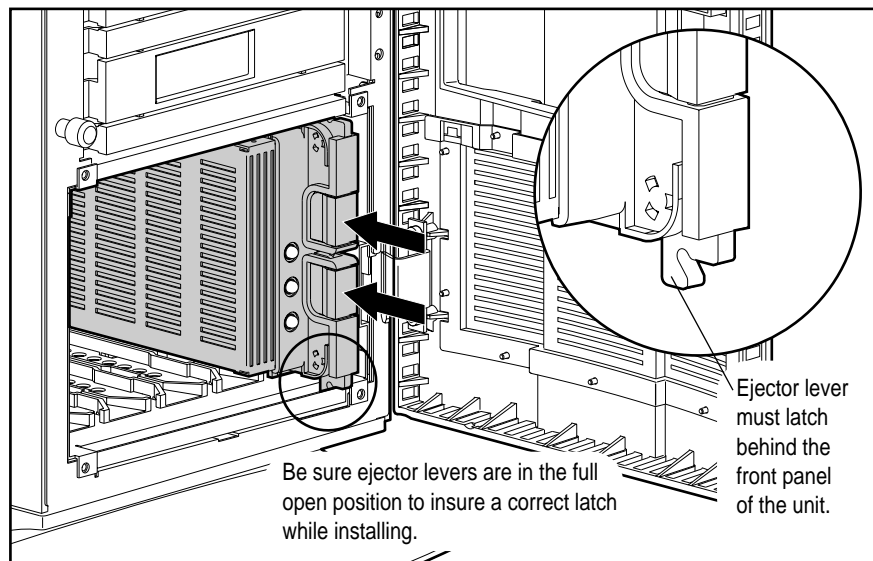
## Replacing Hot-Pluggable Hard Drives

The front access drive bay area is behind the front bezel door and can hold up to four or five third-height hot-pluggable hard drives, depending on the optional drive cage.



**Figure 2-13.** Removing a Hot-Pluggable Hard Drive

1. Press the releases on the ejector levers [A] and swing levers out [B] as shown. This will pull the drive out of the backplane connector.
2. Slide the hot-pluggable hard drive out [C].

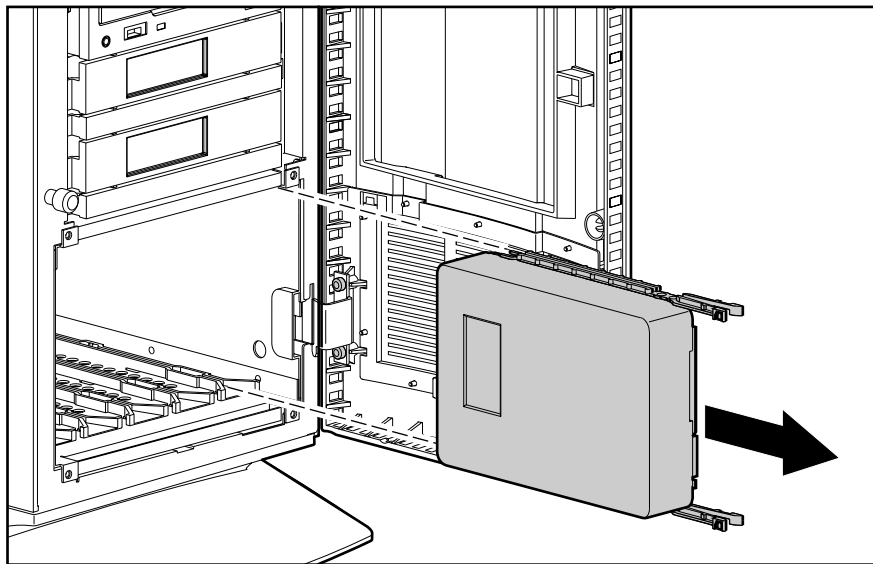


**Figure 2-14.** Replacing a Hot-Pluggable Hard Drive

### To Install a Drive

1. Slide the hot-pluggable hard drive all the way into the drive cage.
2. Swing the ejector levers in to seat the drive tray into the backplane connector.

## Replacing Non-Hot-Pluggable Hard Drives



**Figure 2-15.** Removing a Non-Hot-Pluggable Hard Drive

1. Remove the large access panel.
2. Disconnect the power and signal cables from the rear of the hard drive.
3. Squeeze the two release tabs on each side of the drive and slide the drive out.

Reverse steps 1 to 3 to replace a non-hot-pluggable hard drive.

---

**IMPORTANT:** Ensure that the SCSI ID setting on the replaced non-hot-pluggable drive matches the SCSI ID setting on the removed drive.

---

## Cable Folding and Routing Diagrams



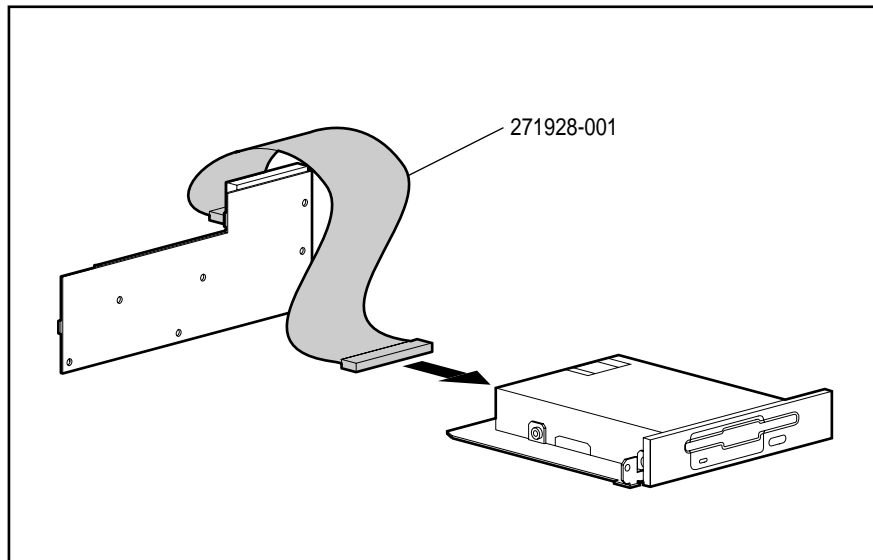
**CAUTION:** When routing cables, always make sure that the cables are not in a position where they will be pinched or crimped.

**IMPORTANT:** All SCSI hard drives on the same SCSI bus must be internal (within the server) or in an external storage system, but not both. A configuration with both internal and external SCSI hard drives requires more than one single-channel SCSI controller. A multi-channel controller, such as the Compaq SMART-2 Array Controller, supports both internal and external SCSI hard drives on separate SCSI buses.

**IMPORTANT:** All integrated 32-Bit SCSI-2 Controllers must be terminated by connecting one of the following to the Wide-Ultra SCSI connector on the system board:

- Terminated SCSI cable
- SCSI cable that is also attached to a hot-pluggable backplane
- SCSI cable that is also attached to an internal SCSI ribbon cable for non-hot-pluggable SCSI drives

### Cable Diagram for Diskette Drive



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**2-19**

**Figure 2-16.** Diskette Drive Cable (Spares Part No. 271928-001)



## Cable Diagram for IDE/CD-ROM

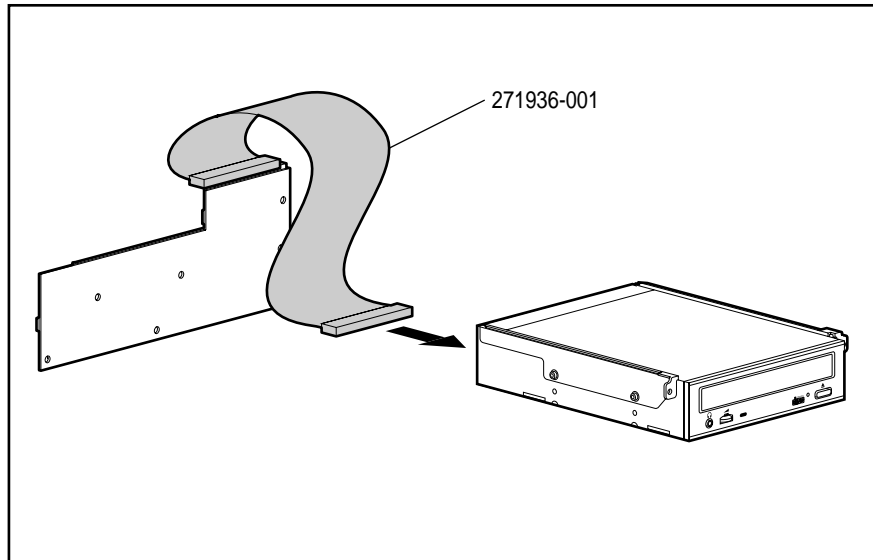


Figure 2-17. IDE/CD-ROM Cable (Spares Part No. 271936-001)

## Cable Diagram for Hot-Pluggable Drive Cages

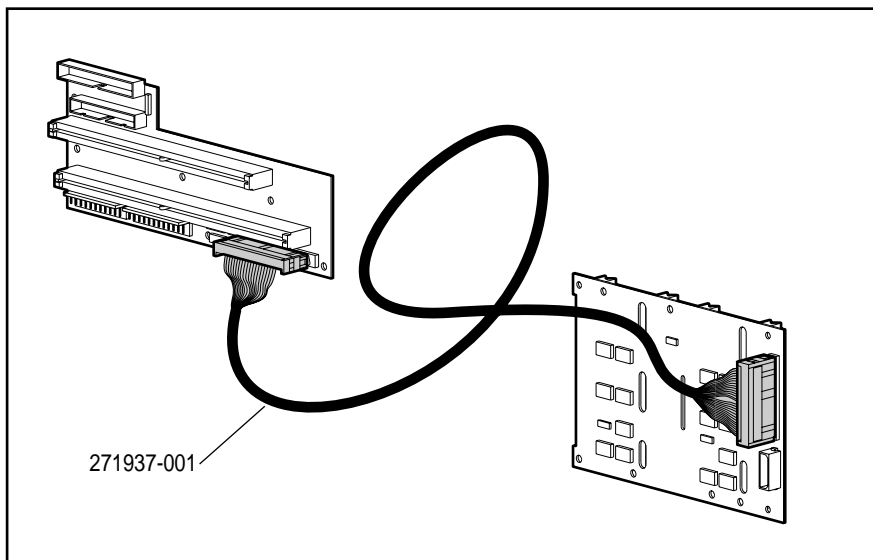


Figure 2-18. Wide SCSI Cables (Hot-pluggable) (Spares Part No. 271937-001)

## Cable Diagram for Non-Hot-Pluggable Drive Cages

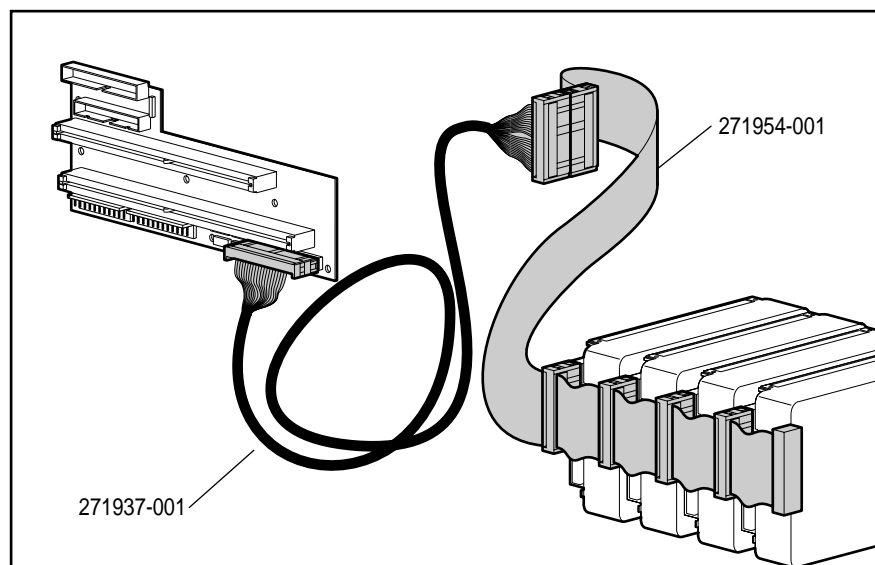


Figure 2-19. SCSI Cable (Non-Hot-Pluggable) (Spares Part No. 271954-001)

## Cable Diagram for Duplexed Hot-Pluggable Hard Drives

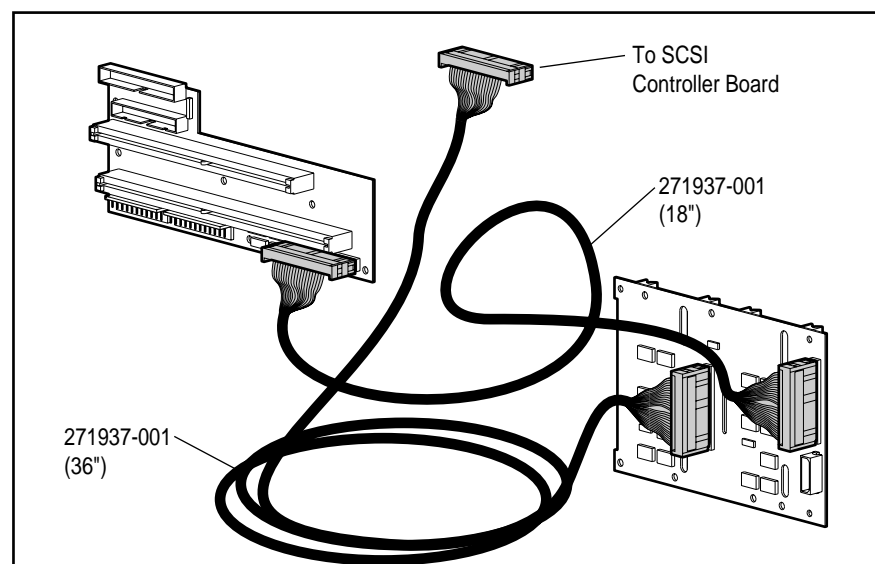
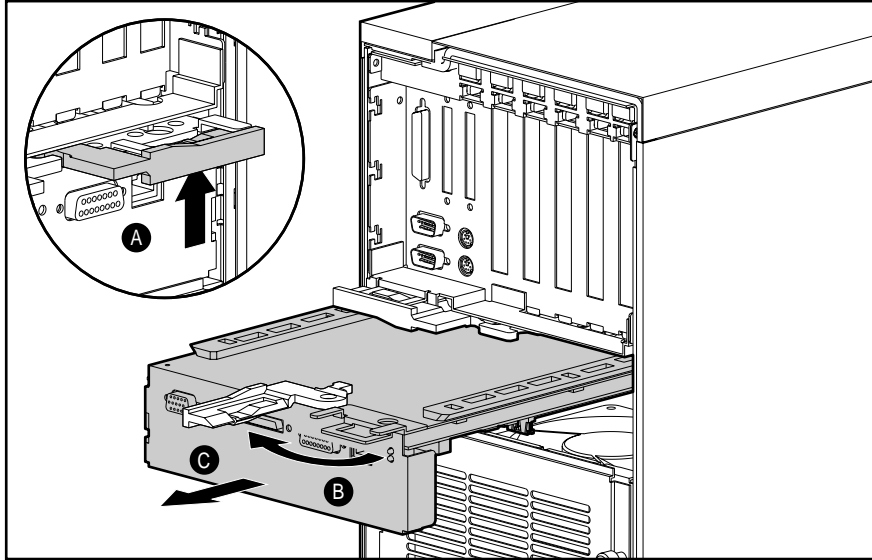


Figure 2-20. Cables for Duplexed Hot-Pluggable Hard Drives (Spares Part No. 271937-001)

## Processor Tray Assembly



**Figure 2-21.** Removing the Processor Tray Assembly

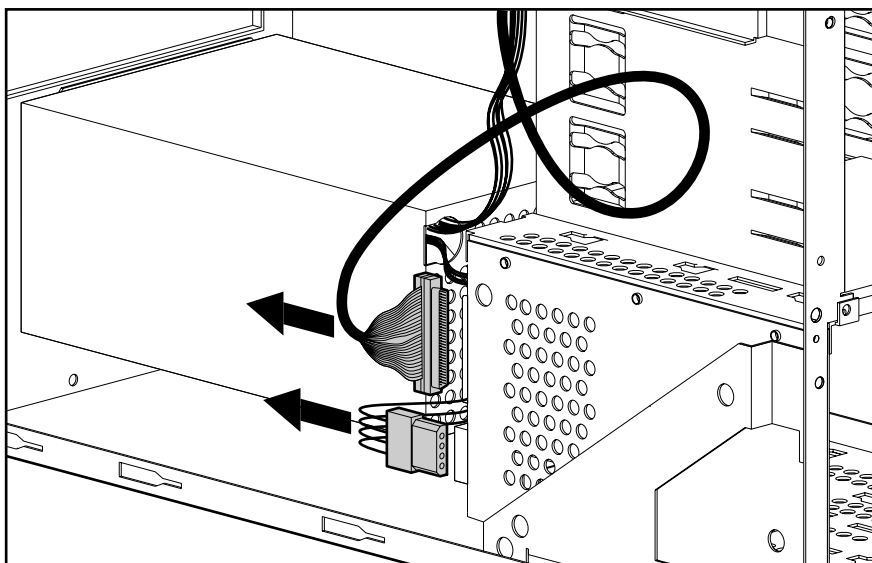
1. If installed, remove the security screw.
2. Lift the catch on the release lever [A] and swing the lever out [B] to unlock the processor tray assembly.
3. Pull out the tray [C].

Reverse steps 1 to 3 to replace the processor tray assembly.

## Boards

This section describes how to remove and replace the hot-pluggable hard drive backplane board, the processor backplane board, memory modules, the system I/O board tray assembly, processor power module, processor chip, processor board, and expansion boards.

### Drive Cage with Hot-Pluggable Drive Backplane Board



**Figure 2-22.** Removing the Cables from the Hot-Pluggable Drive Backplane Board

1. Remove the large access panel.
2. Disconnect the signal and power cables from the backplane board.

2-24 Removal and Replacement Procedures

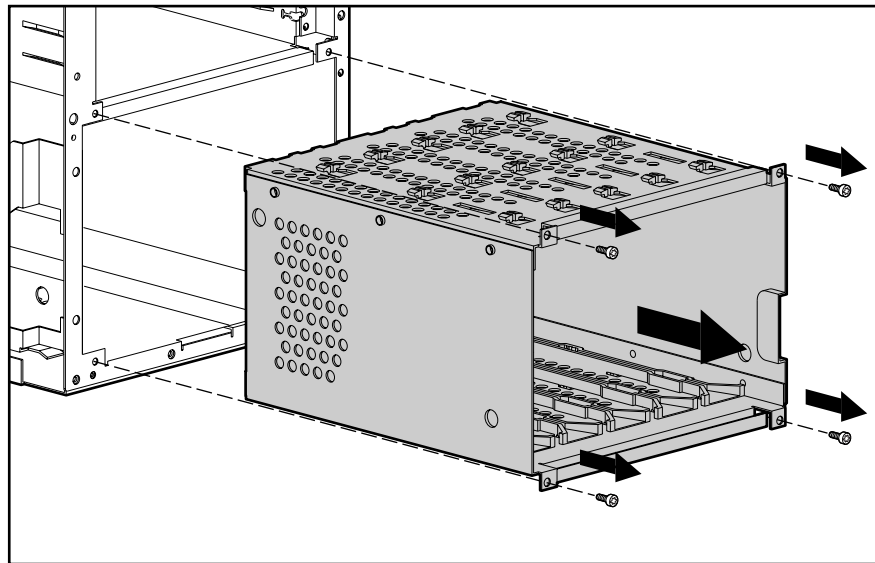


Figure 2-23. Removing the Drive Cage

3. Label and remove all hard drives from the drive cage.

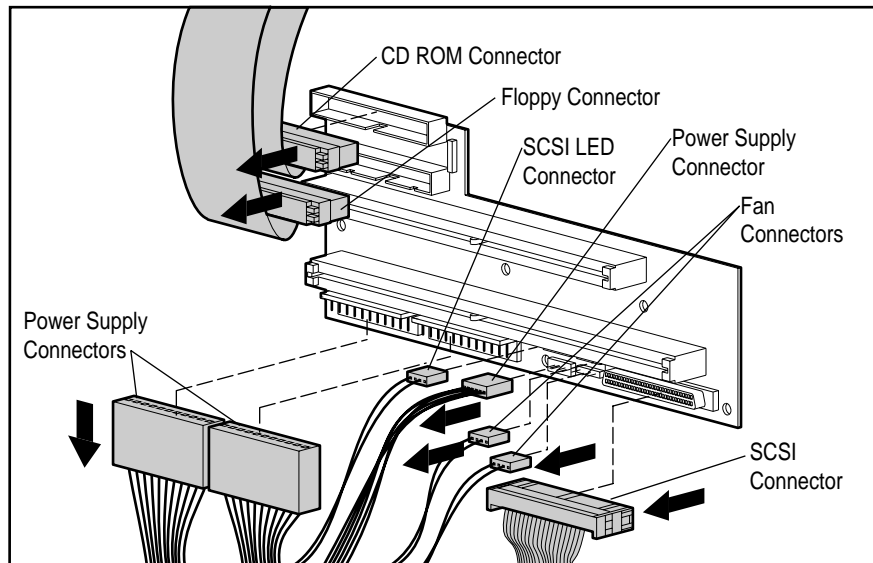


**CAUTION:** Be sure to label the drives before removing them so that they can be replaced in their original positions. Failure to do so will result in permanent data loss.

4. Remove the four retaining screws from the drive cage.
5. Pull out the drive cage with backplane board.

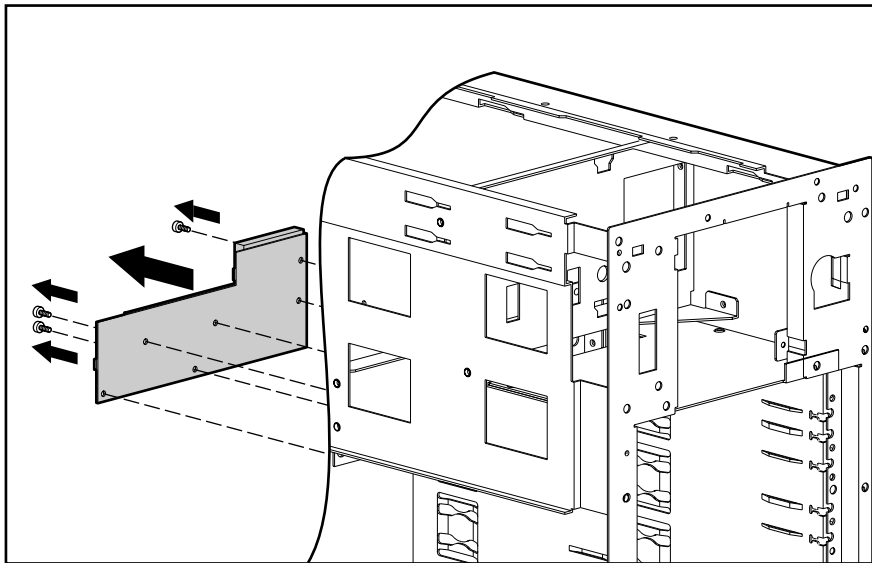
Reverse steps 1 to 5 to replace the drive cage and backplane board.

## System I/O and Processor Backplane Board



**Figure 2-24.** Removing the System I/O and Processor Backplane Board

1. Remove the large access panel.
2. Remove the processor tray assembly.
3. Remove the system I/O board tray assembly (refer to “System I/O Board Tray Assembly” later in this document).
4. Disconnect the signal and power cables for the processor backplane board.



**Figure 2-25.** Removing the System I/O and Processor Backplane Board

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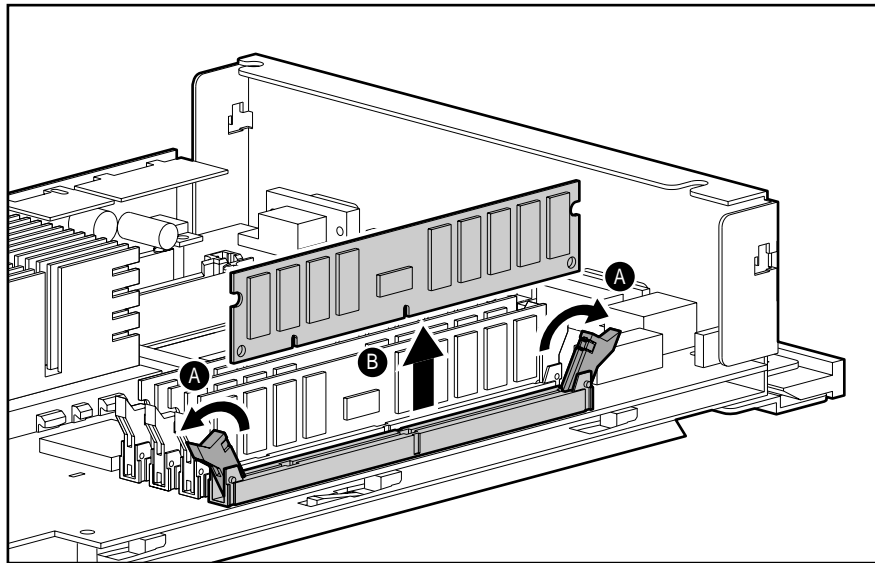
## 2-26 Removal and Replacement Procedures

5. Remove the retaining screws.
6. Slide the processor backplane board over, and lift it off.

Reverse steps 1 to 6 to replace the system I/O and processor backplane board.

## Memory

The Compaq ProLiant 2500 and 2500R Servers come standard with 32 megabytes of memory. Memory can be expanded to a maximum of 1.024 gigabytes by installing 60-ns or faster EDO- or FASTPAGE-buffered, 32-, 64-, 128-, or 256-MB, 4-K refreshed Dual Inline Memory Modules (DIMMs) on the Pentium Pro processor board.



**Figure 2-26.** Removing the DIMM Module

1. If installed, remove the security screw for the processor tray assembly.
2. Slide out the processor tray assembly from the rear of the unit.
3. Turn the assembly over.
4. Press both DIMM connector latches outward [A].
5. Lift the DIMM module out [B]

Reverse steps 1 to 5 to replace the DIMM module.

---

**IMPORTANT:** A memory module can be installed one way only. Be sure to match the two *key slots* on the module with the tab on the memory socket. Push the module down into the socket, ensuring that the module is fully inserted and properly seated.

---

The following guidelines **MUST** be followed when installing or replacing memory:

- Use only 32-, 64-, 128-, or 256-megabyte; EDO- or FASTPAGE-buffered; 4-K refreshed DIMMs.
- DIMMs must be 60-ns or faster.



**CAUTION:** Use only Fast-Page/EDO Mode 72-Bit Wide JEDEC standard DIMMs using 3.3 volts and ECC capability. Use EDO-buffered DIMMs. Non-compatible DIMMs may adversely affect data integrity.

**NOTE:** The specific DIMM bit pattern required to support error checking and correcting (ECC) memory is based on the parity scheme; one byte data, one bit parity. The data byte and parity are constructed of DRAMs that are "n" locations deep by 4-bits wide or 1-bit wide and "n" can be any number. (That is, "n" locations deep x 4-bits wide or "n" locations deep x 1-bit wide.) Use only Compaq DIMMs or JEDEC-compliant DIMMs that conform to this parity scheme.

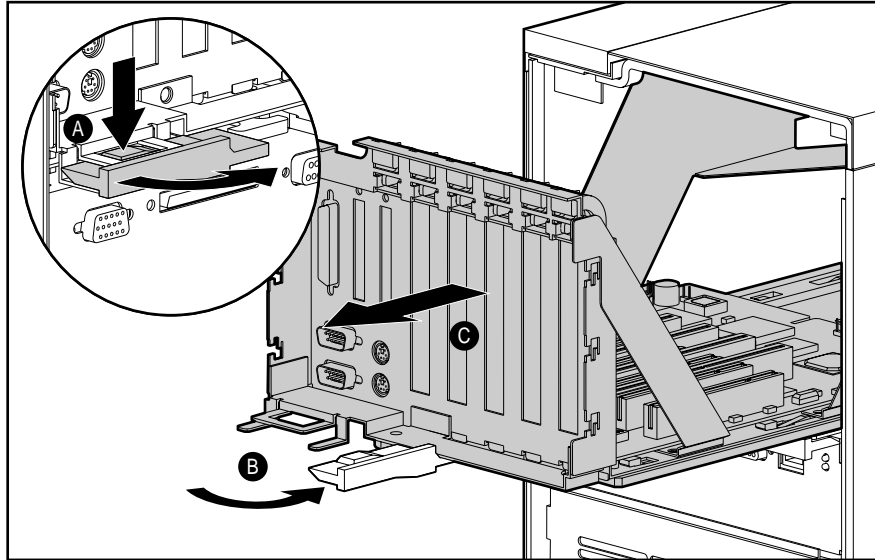
The following table shows typical memory configurations for Compaq ProLiant 2500 and 2500R Servers with the Pentium Pro processor.

**Table 2-2**  
**Examples of DIMM Upgrade Combinations**

| Total Memory | Slot 1 | Slot 2 | Slot 3 | Slot 4 |
|--------------|--------|--------|--------|--------|
| 32 MB        | 32 MB  |        |        |        |
| 64 MB        | 32 MB  | 32 MB  |        |        |
| 64 MB        | 64 MB  |        |        |        |
| 96 MB        | 64 MB  | 32 MB  |        |        |
| 96 MB        | 32 MB  | 32 MB  | 32 MB  |        |
| 256 MB       | 128 MB | 128 MB |        |        |
| 256 MB       | 64 MB  | 64 MB  | 64 MB  | 64 MB  |
| 512 MB       | 128 MB | 128 MB | 128 MB | 128 MB |
| 512 MB       | 256 MB | 256 MB |        |        |
| 768 MB       | 256 MB | 256 MB | 128 MB | 128 MB |
| 1.024 GB     | 256 MB | 256 MB | 256 MB | 256 MB |



## System I/O Board Tray Assembly



**Figure 2-27.** Removing the System I/O Board Tray Assembly

1. Remove the small access panel.
2. If installed, remove the security screw.
3. Disconnect all cables from expansion boards.
4. Press down the catch on the release lever [A] and swing the lever out [B] to unlock the system I/O board tray assembly.
5. Pull out the tray [C].
6. Remove all expansion boards from the assembly.

Reverse steps 1 to 6 to replace the system I/O board tray assembly.

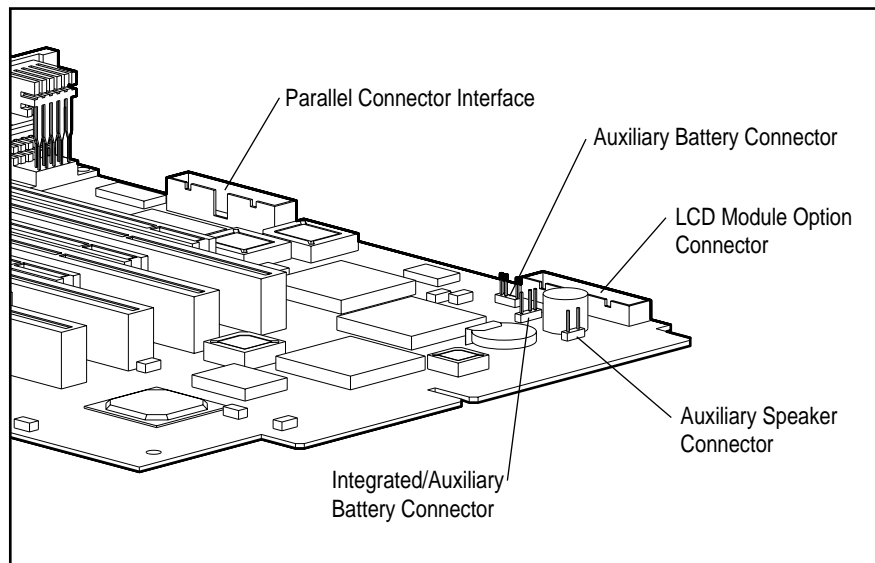


Figure 2-28. System I/O Board Connectors

## Processor Power Module

The processor power modules are located on the processor board.

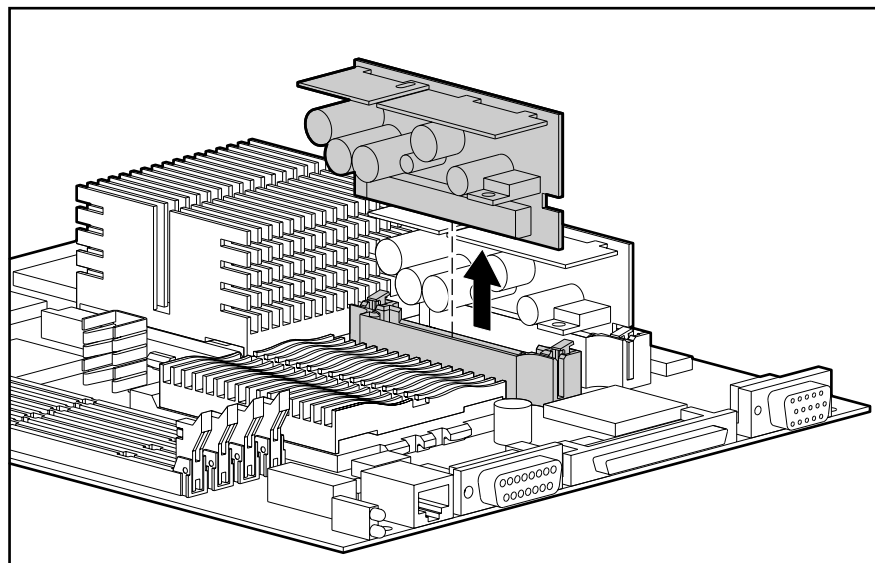


Figure 2-29. Removing the Processor Power Module

1. If installed, remove the security screw for the processor tray assembly.
2. Slide out the processor tray assembly from the rear of the unit.

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## 2-30 Removal and Replacement Procedures

3. Turn over the tray assembly.
4. Lift out the module.

Reverse steps 1 to 4 to replace the processor power module.

### Processor Chip

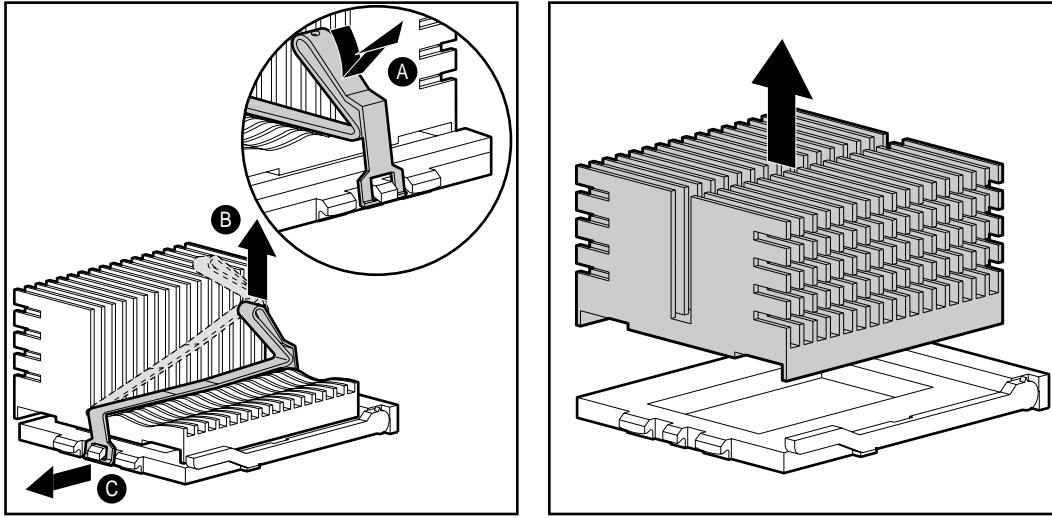
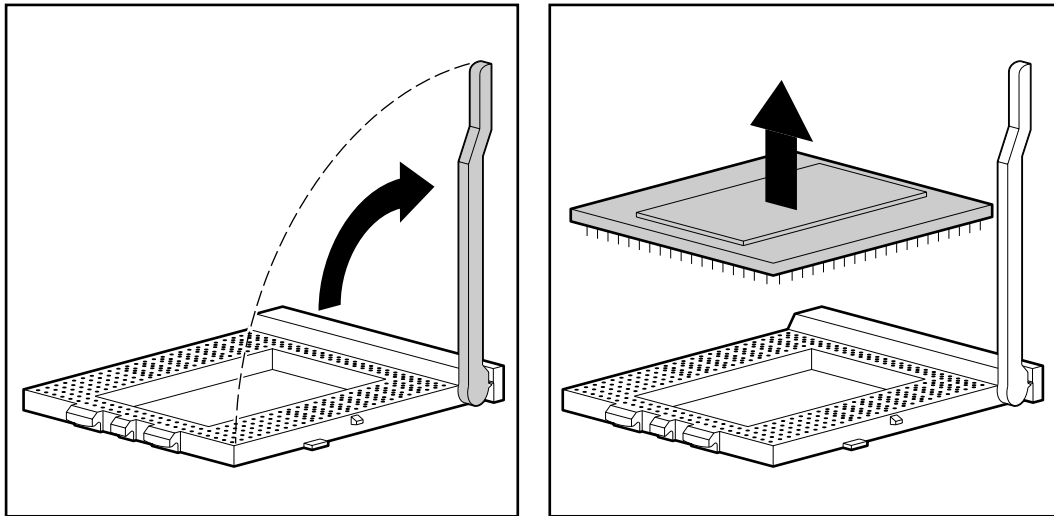


Figure 2-30. Removing the Heat Sink

1. If installed, remove the security screw for the processor tray assembly.
  2. Slide out the processor tray assembly from the rear of the unit.
  3. Turn over the tray assembly.
  4. Press down and lift up [A] on the heat sink retaining clip. Pull it up [B] and off [C].
  5. Remove the heat sink and thermal pad.
-



**Figure 2-31.** Removing a Processor Chip

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## 2-32 Removal and Replacement Procedures

6. Unlatch the lever and lift.
7. Remove processor chip.

Reverse steps 1 to 7 to replace the processor chip.



**CAUTION:** Align the pin pattern on the processor to that of the processor socket.

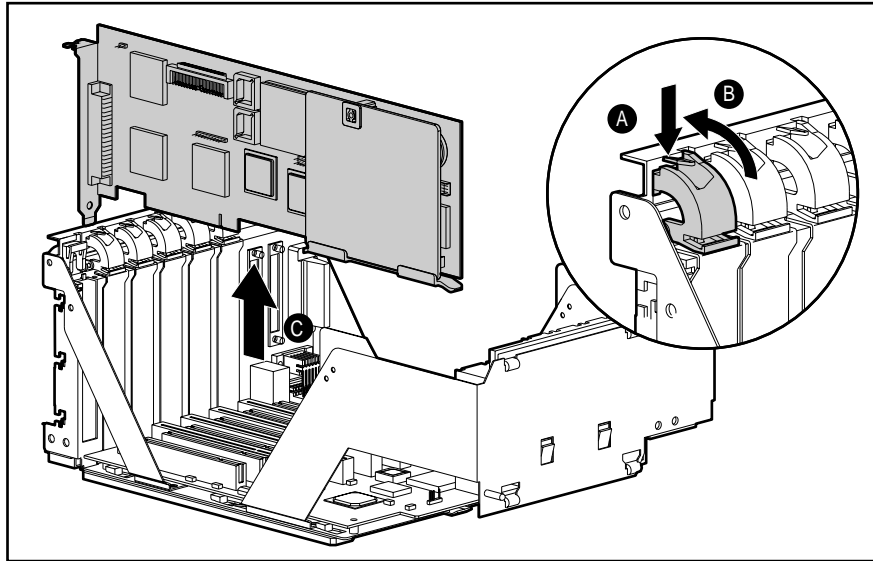
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## Processor Board

The processor board can be replaced only by replacing the processor tray assembly.

1. If installed, remove the security screw for the processor tray assembly.
  2. Slide out the processor tray assembly from the rear of the unit.
  3. Remove memory modules and install them on the new processor tray assembly.
  4. Remove the processor power module and install it on the new processor tray assembly.
  5. Remove the processor chip and install it on the new processor tray assembly.
  6. Slide in the new processor tray assembly.
-

## Expansion Boards



**Figure 2-32.** Removing the Expansion Board

1. Remove the small access panel.
2. Press on the top of the expansion slot latch [A] and open the latch toward the rear of the expansion slot cage [B].
3. Pull out expansion board [C].

Reverse steps 1 to 3 to replace the expansion board.

## Power Supply

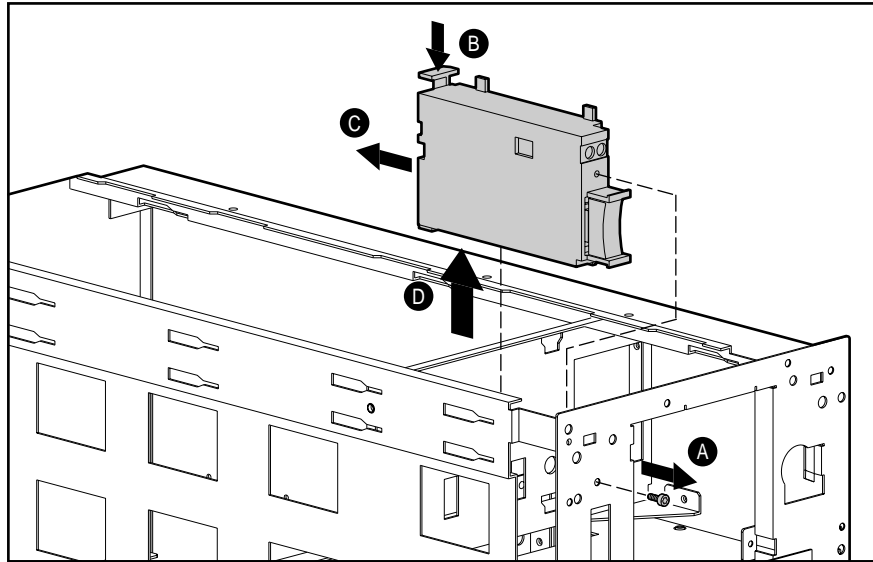
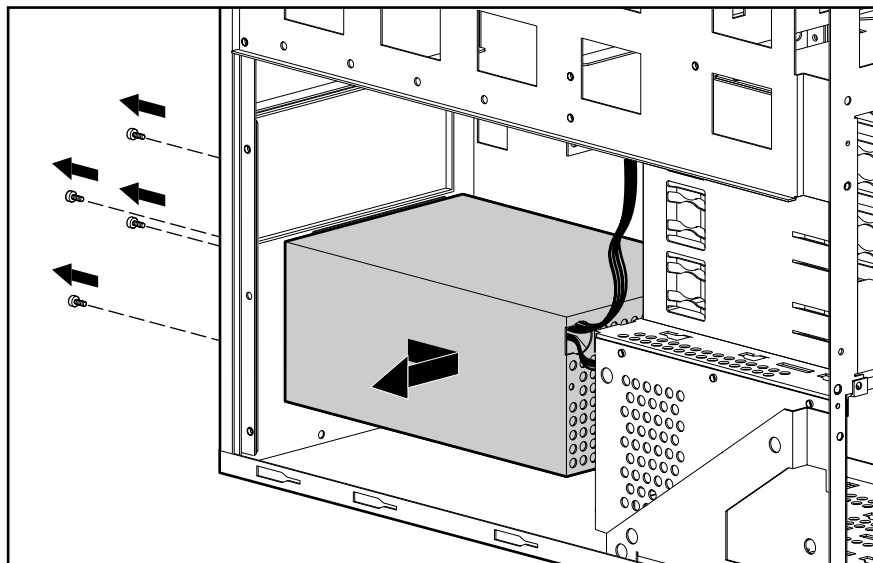


Figure 2-33. Removing the Power Switch

1. Remove the large access panel.
2. Disconnect all power connectors from boards and/or peripheral devices.
3. Remove the retaining screw from the power switch bracket [A].
4. Press the release tab on the power switch bracket [B] and slide the bracket back [C] and up [D].
5. Remove power switch and cable from bracket (refer to Figure 2-35).



**Figure 2-34.** Removing the Power Supply

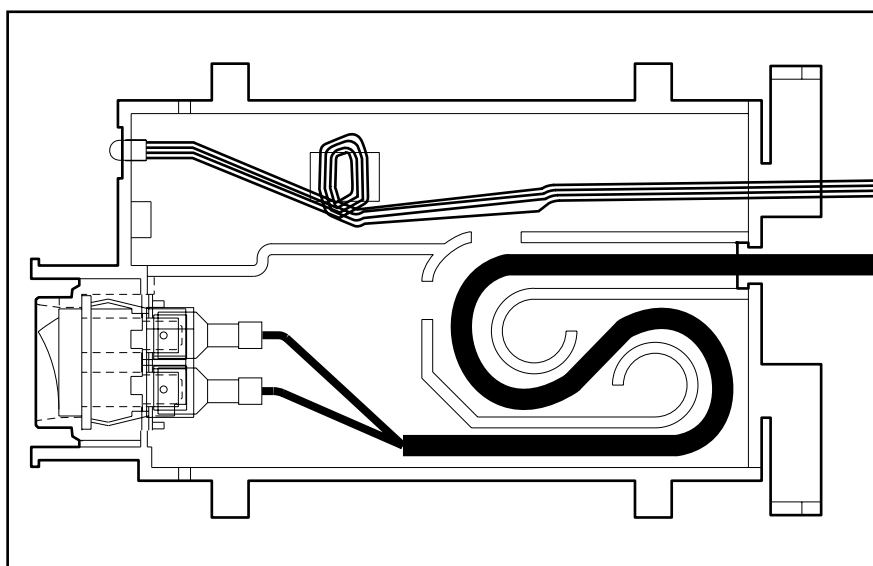
6. Remove the four screws at the rear of power supply.
7. Lift power supply out, pulling switch and cable through chassis.

Reverse steps 1 to 7 to replace the power supply.

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**IMPORTANT:** When replacing the power supply, make sure that the power switch cable is properly threaded through the bracket's strain relief as shown in Figure 2-35.

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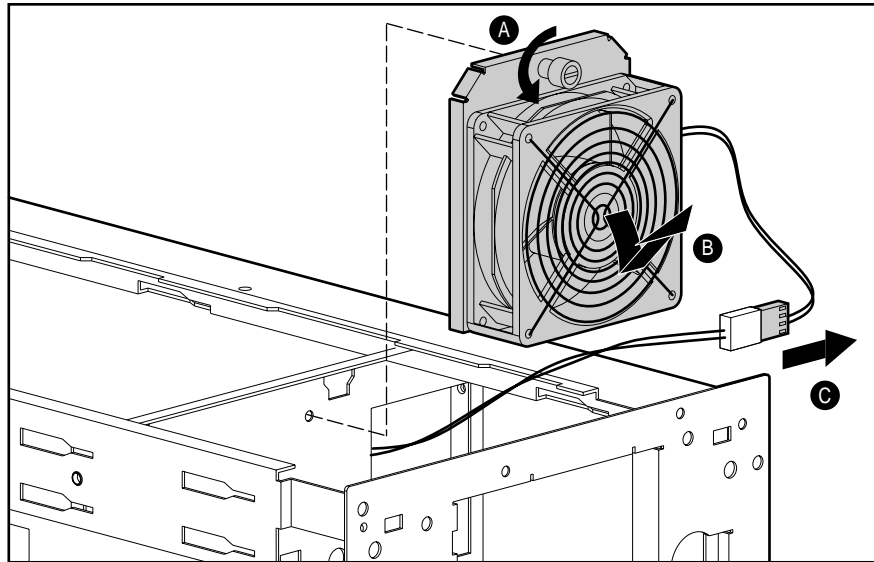


**Figure 2-35.** Power Supply Switch Cable Strain Relief Bracket



## Miscellaneous Parts

### System I/O Fan

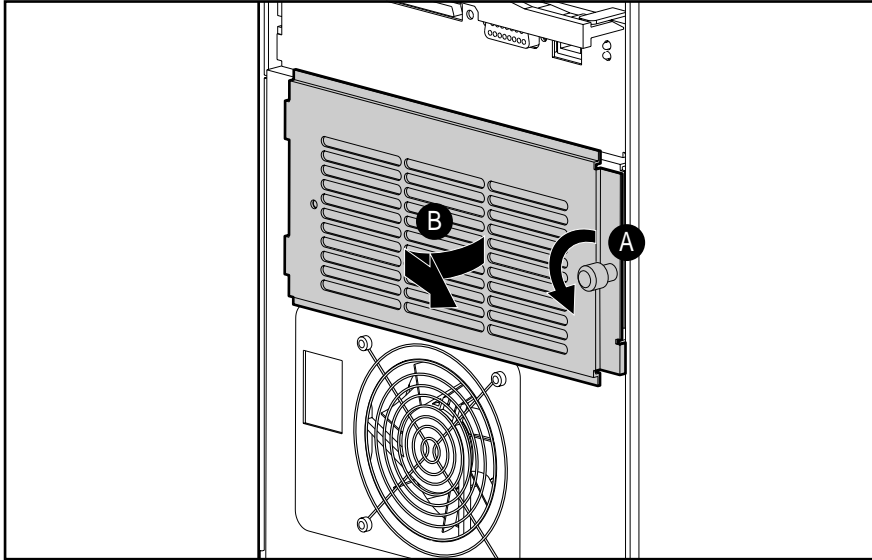


**Figure 2-36.** Removing the System I/O Fan

1. Remove the small access panel.
2. Turn the thumbscrew [A] to loosen the system I/O fan.
3. Tilt the system I/O fan [B] and pull it out.
4. Disconnect the fan cable [C].

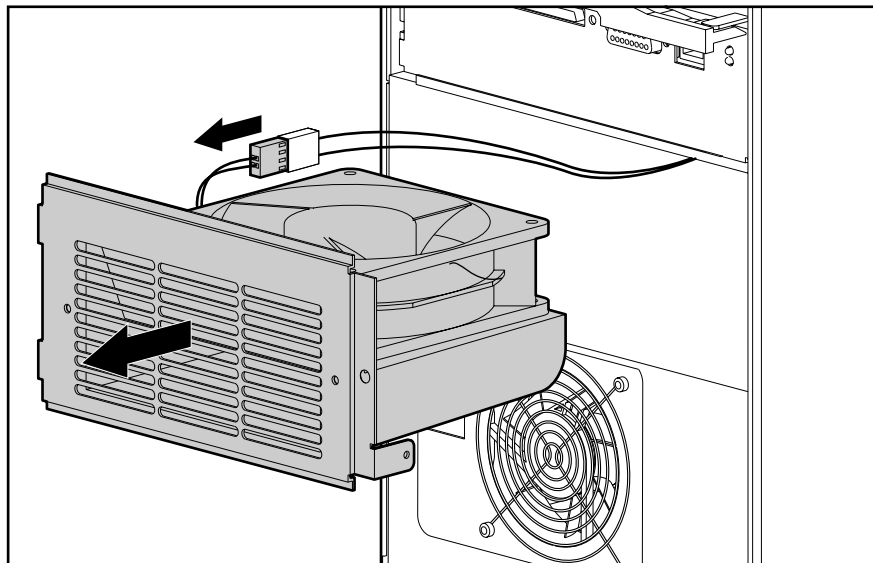
Reverse steps 1 to 4 to replace the system I/O fan.

## Processor Fan



**Figure 2-37.** Opening the Processor Fan Door

1. Turn the thumb screw on the processor fan door [A].
2. Open the processor fan door and pull out the processor fan [B].



**Figure 2-38.** Removing the Processor Fan

3. Disconnect the fan cable.

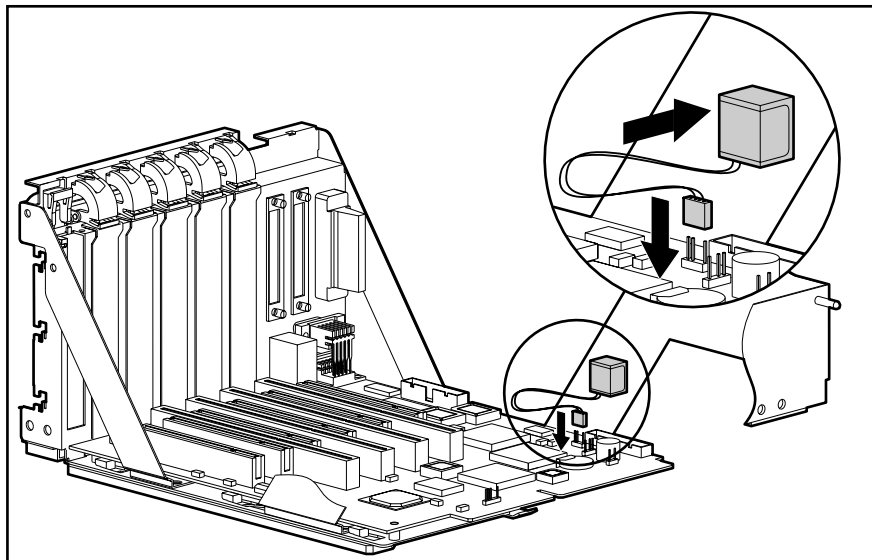
Reverse steps 1 to 3 to replace the processor fan.

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**2-38** *Removal and Replacement Procedures*

## Battery



**Figure 2-39.** Battery Module

1. Remove the small access panel.
2. Remove expansion boards if necessary.
3. Connect the battery cable to the battery header on the system I/O board.
4. Move the jumper on connector E2 from pins 1 and 2 to pins 2 and 3.
5. Attach the battery to the tray assembly using the self-stick adhesive.
6. Run Compaq System Configuration Utility.



**CAUTION:** Do not remove the lithium battery from the system I/O board. Permanent damage may occur to the system I/O board if removed. If the battery fails, use the battery module replacement.



**WARNING:** The battery/clock module contains a lithium battery that may explode if mishandled. Do not abuse, recharge, disassemble, or dispose of in fire or heat above 90° C, incinerate, or expose to water or fire. Use only replacement battery/clock modules supplied by Compaq Computer Corporation.

## Chapter 3

# Diagnostic Tools

This chapter describes software and firmware diagnostic tools available for the Compaq Server products. These include:

- Power-On Self-Test (POST)
- Diagnostics (DIAGS)
- Drive Array Advanced Diagnostics (DAAD)
- Automatic Server Recovery
- ROMPaq utilities to upgrade flash ROMs

## Utility Access

The Compaq SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain your system, including:

- System Configuration Utility
- Array Configuration Utility
- Drive Array Advanced Diagnostics Utility
- ROMPaq Firmware Upgrade Utilities



**CAUTION:** Do not select the Erase Utility when running the SmartStart and Support Software CD. This will result in data loss to the entire system.

---

There are several ways to access these utilities:

- **Run the Utilities on the System Partition.**

If the system was installed using the SmartStart utility, the Compaq utilities will automatically be available on the system partition. The system partition could also have been created during a manual system installation.

To run the utilities on the system partition, boot the system and press **F10** when the cursor moves to the upper right corner of the screen. (If the cursor does not move to the upper right corner of the screen, the system partition does not exist.) Then select the utilities from the menu.

- ☐ The System Configuration Utility is available under System Configuration menu.
- ☐ The Array Configuration Utility is available under the System Configuration menu.

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### 3-2 Diagnostic Tools

- ☐ The Drive Array Advanced Diagnostics Utility is available under the Diagnostics and Utilities menu.
- ☐ The ROMPaq Firmware Upgrade Utility is available under the Diagnostics and Utilities menu.

#### ■ Run the Utilities from diskette.

You can also run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.

You can also create a diskette version of the utility from the SmartStart and Support Software CD. To create diskette versions of the utilities from the CD:

1. Boot the computer from the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select *Create Support Software* and press the Next button.
3. Select the diskette you would like to create from the list and follow the instructions on the screen.

#### ■ Run the Utilities from the Compaq SmartStart and Support Software CD.

You can run some utilities directly from the Compaq SmartStart and Support Software CD. To run these utilities:

1. Boot the Compaq SmartStart and Support Software CD.
2. From the Compaq System Utilities screen, select the utility you wish to run and press the Next button.
  - ☐ To execute the System Configuration Utility, select *Run System Configuration Utility*.
  - ☐ To execute the Array Configuration Utility, select *Run Array Configuration Utility*.

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**IMPORTANT:** Only the System Configuration Utility and the Array Configuration Utility can be executed from the Compaq SmartStart and Support Software CD. All other utilities can be executed only from the system partition or from diskette.

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## Power-On Self-Test (POST)

POST is a series of diagnostic tests that run automatically on Compaq computers when the system is turned on. POST checks the following assemblies to ensure that the computer system is functioning properly:

- Keyboard
- Power supply
- System board
- Memory
- Memory expansion boards
- Controllers
- Diskette drives
- Hard drives

If POST finds an error in the system, an error condition is indicated by an audible and/or visual message. If an error code is displayed on the screen during POST or after resetting the system, follow the instructions in Table 3-1. The error messages and codes listed in Table 3-1 include all codes generated by Compaq products.

Your system will generate only those codes that are applicable to your configuration and options.

**Table 3-1**  
**POST Error Messages**

| Error Code                                       | Beeps | Probable Source of Problem  | Action  |
|--|-------|---|---|
| A Critical Error occurred prior to this power-up | None  | A catastrophic system error, which caused the server to crash, has been logged. | Run Diagnostics. Replace failed assembly as indicated.                                  |
| 101-ROM Error                                    | 1L,1S | System ROM checksum.  | Run Diagnostics. Replace failed assembly as indicated or contact your service provider. |
| 101-I/O ROM Error                                | None  | Options ROM checksum.   | Run Diagnostics. Replace failed assembly as indicated or contact your service provider. |

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**3-4** *Diagnostic Tools*

|                            |      |                          |  |
|----------------------------|------|--------------------------|--|
| 102-System Board Failure   | None | DMA, timers, etc.        | Replace the system board. Run the Compaq System Configuration Utility. |
| 104-ASR Timer Failure      | None | System board failure.    | Run Diagnostics.   |
| 162-System Options Not Set | 2S   | Configuration incorrect. | Run the System Configuration Utility and correct.                      |

*Continued*



**POST Error Messages** *Continued*

| Error Code  | Beeps | Probable Source of Problem  | Action  |
|---|-------|---|---|
| 163-Time & Date Not Set                           | 2S    | Invalid time or date in configuration memory.   | Run the System Configuration Utility and correct.                           |
| 164-Memory Size Error                             | 2S    | Configuration memory incorrect.   | Run the System Configuration Utility and correct.                           |
| 170- Expansion Device Not Responding              | None  | EISA or PCI Expansion board failure.  | Check board for secure installation. Replace the failed board if necessary. |
| 172- Configuration Nonvolatile Memory Invalid     | None  | Nonvolatile configuration corrupt or jumper installed.  | Run the System Configuration Utility and correct.                           |
| 172-1 Configuration Nonvolatile Memory Invalid    | None  | Nonvolatile configuration corrupt.  | Run the System Configuration Utility and correct.                           |
| 172-2 IRC Configuration Invalid                   | None  | IRC configuration not set up properly.<br>- COM Port invalid<br>- PCI COM Port<br>- Incorrect IRQ | Run the System Configuration Utility and correct.                           |
| 173- Slot ID Mismatch                             | None  | Board replaced, but configuration not updated.  | Run the System Configuration Utility and correct.                           |
| 174- Configuration/Slot Mismatch Device Not Found | None  | EISA or PCI board not found.  | Run the System Configuration Utility and correct.                           |
| 175- Configuration/Slot Mismatch Device Found     | None  | EISA or PCI board added, configuration not updated.   | Run the System Configuration Utility and correct.                           |
| 176-Slot with Not Readable ID Yields Valid ID     | None  | EISA or PCI board in slot that should contain an ISA board.                                       | Run the System Configuration Utility and correct.                           |
| 177-Configuration Not Complete                    | None  | Incomplete System Configuration.  | Run the System Configuration Utility and correct.                           |

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**3-6** *Diagnostic Tools*

|                                     |      |   |   |
|-------------------------------------|------|---|---|
| 178-Processor Configuration Invalid | None | Processor type or step does not match configuration memory. | Run the System Configuration Utility and correct. |
| 179-System Revision Mismatch        | None | A board was installed that has a different revision date.   | Run the System Configuration Utility and correct. |
| 201-Memory Error                    | None | RAM failure.  | Run Diagnostics.                                  |
| 203-Memory Address Error            | None | RAM failure.  | Run Diagnostics.                                  |

*Continued*

**POST Error Messages** *Continued*

| Error Code   | Beeps  | Probable Source of Problem   | Action  |
|--|--------|--|---|
| 205-Cache Memory Error<br>Option-Cache Memory Error        | None   | Cache memory error.<br><br>Option Cache Memory Error.  | Replace the processor board in the slot indicated.<br>Replace the option cache board.                                       |
| 206-Cache Controller Error                                 | None   | Cache controller failure.  | Run Diagnostics.  |
| 207-Invalid Memory Configuration - Check SIMM Installation | None   | Memory module installed incorrectly.   | Verify placement of memory modules.   |
| 208-Invalid Memory Speed - Check SIMM Installation         | 1L, 1S | The speed of the memory is too slow, where: xx00 = expansion board<br>SIMMs are too slow, or<br>00yy = system board<br>SIMMs are too slow.<br>xx and yy have same bit set. | The speed of the memory modules must be 60 or 70 ns. Verify the speed of the memory modules installed and replace.          |
| 211-Cache Switch Set Incorrectly                           | None   | Switch not set properly during installation or upgrade.  | Verify switch settings.   |
| 212-System Processor Failed/Mapped out                     | 1S     | Processor in slot x failed.  | Run Diagnostics and replace failed processor.   |
| 213-Cache size Error<br>(ProSignia VS only)                | None   | Invalid optional cache size.   | Replace cache with 256K cache.  |
| 213-System Processor Not Installed                         | 1S     | System processor configured for slot indicated is missing.   | Install processor in the slot indicated or run the System Configuration Utility to remove the processor from the .CFG file. |
| 301-Keyboard Error   | None   | Keyboard failure.  | Turn off the computer, then reconnect the keyboard.   |

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**3-8** *Diagnostic Tools*

|  |      |   |  |
|--|------|---|--|
| 301-Keyboard Error<br>or Test Fixture<br>Installed | None | Keyboard failure.   | Replace the keyboard.  |
| ZZ-301-Keyboard<br>Error                           | None | Keyboard failure. (ZZ<br>represents the<br>Keyboard Scan Code.) | 1. A key is stuck. Try to<br>free it.<br>2. Replace the<br>keyboard. |
| 303-Keyboard<br>Controller Error                   | None | System board,<br>keyboard, or mouse<br>controller failure.      | Check with your<br>Authorized Compaq<br>Reseller.                    |

*Continued*

**POST Error Messages** *Continued*

| Error Code   | Beeps | Probable Source of Problem  | Action  |
|--|-------|---|---|
| 304-Keyboard or System Unit Error                                  | None  | Keyboard, keyboard cable, or system board failure.                | <ol style="list-style-type: none"> <li>1. Make sure the keyboard is attached.</li> <li>2. Run Diagnostics to determine which is in error.</li> <li>3. Replace the part indicated.</li> </ol>      |
| 40X-Parallel Port X Address Assignment Conflict                    | 2S    | Both external and internal ports are assigned to parallel port X. | Run the System Configuration Utility.   |
| 402-Monochrome Adapter Failure                                     | 1L,2S | Monochrome display controller.                                    | Replace the monochrome display controller.  |
| 501-Display Adapter Failure  | 1L,2S | Video display controller.   | Replace the video board.  |
| 601-Diskette Controller Error                                      | None  | Diskette controller circuitry failure.                            | <ol style="list-style-type: none"> <li>1. Make sure the diskette drive cables are attached.</li> <li>2. Replace the diskette drive and/or cable.</li> <li>3. Replace the system board.</li> </ol> |
| 605-Diskette Drive Type Error                                      | 2S    | Mismatch in drive type.   | Run the System Configuration Utility to set diskette type correctly.  |
| 702-A coprocessor has been detected that was not reported by CMOS. | None  | Installed coprocessor not configured.                             | Run the System Configuration Utility and correct.   |
| 703-CMOS reports a coprocessor that has not been detected          | 2S    | Coprocessor or configuration error.                               | <ol style="list-style-type: none"> <li>1. Run the System Configuration Utility and correct.</li> <li>2. Replace the coprocessor.</li> </ol>   |

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**3-10** *Diagnostic Tools*

|   |    |  |   |
|---|----|--|---|
| 1151-Com Port 1<br>Address<br>Assignment<br>Conflict          | 2S | Both external and<br>internal serial ports are<br>assigned to COM1.                  | Run the System<br>Configuration Utility<br>and correct. |
| 1152-Com Port 2, 3,<br>or 4 Address<br>Assignment<br>Conflict | 2S | Both external and<br>internal serial ports are<br>assigned to COM2,<br>COM3 or COM4. | Run the System<br>Configuration Utility<br>and correct. |

*Continued*

**POST Error Messages** *Continued*

| Error Code  | Beeps | Probable Source of Problem   | Action  |
|---|-------|--|---|
| 1600-Server Manager/R Failure                                   | None  | Server Manager/R board failure. Error code displays after error message. | Run Diagnostics. Replace failed assembly as indicated or contact your service provider. |
| 1610-Temperature violation detected. Waiting for system to cool | 2S    | Ambient system temperature too hot.                                      | Check fan in system environment.  |
| 1611-Fan failure detected                                       | 2S    | Required fan not installed or spinning.                                  | Check fans.   |
| 1612-Primary power supply failure.                              | 2S    | Primary power supply has failed.   | Replace power supply as soon as possible.   |
| 1703-SCSI Cable Error Detected                                  | None  | Internal SCSI cable not attached to system connector.                    | Attach terminated cable or internal SCSI cable.   |
| 1730-Fixed Disk 0 does not support DMA Mode                     | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1731-Fixed Disk 1 does not support DMA Mode                     | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1740-Fixed Disk 0 failed Set Block Mode command                 | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1741-Fixed Disk 1 failed Set Block Mode command                 | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1750-Fixed Disk 0 failed Identify command                       | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1751-Fixed Disk 1 failed Identify command                       | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1760-Fixed Disk 0 does not support Block Mode                   | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |
| 1761-Fixed Disk 1 does not support Block Mode                   | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.                                       |

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**3-12** *Diagnostic Tools*

|   |      |  |   |
|---|------|--|---|
| 1771-Primary Disk<br>Port Address<br>Assignment<br>Conflict   | None | Internal and external<br>hard drive controllers<br>are both assigned to<br>the primary address.                                      | Run the System<br>Configuration Utility<br>and correct. |
| 1772-Secondary<br>Disk Port Address<br>Assignment<br>Conflict | None | Address Assignment<br>Conflict. Internal and<br>external hard drive<br>controllers are both<br>assigned to the<br>secondary address. | Run the System<br>Configuration Utility<br>and correct. |

*Continued*



**POST Error Messages** *Continued*

| Error Code  | Beeps | Probable Source of Problem   | Action  |
|---|-------|--|---|
| 1773-Primary Fixed Disk Port Assignment Conflict          | None  | Fixed disk drive error.  | Run the System Configuration Utility and correct.   |
| 1776-Drive Array - SCSI Port Termination Error            | None  | External and internal SCSI drives are both configured to Port 1.   | Re-configure drives.  |
| 1777-Drive Array Error                                    | None  | Cooling fan failure, internal temperature alert or open cover.   | Inspect for cooling fan failure or open cover.  |
| 1778-Drive Array resuming Automatic Data Recovery process | None  | This message appears whenever a controller reset or power cycle occurs while Automatic Data Recovery is in progress. | No action necessary.  |
| 1779-Drive Array Controller detects replacement drives    | None  | Intermittent drive failure and/or possible loss of data.   | If this message appears and drive X has not been replaced, this indicates an intermittent drive failure. This message also appears once immediately following drive replacement whenever data must be restored from backup. |
| 1780-Disk 0 Failure                                       | None  | Hard drive/format error.   | Run Diagnostics. Replace failed assembly as indicated or contact your service provider.   |
| 1781-Disk 1 Failure                                       | None  | Hard drive/format error  | Run Diagnostics. Replace failed assembly as indicated or contact your service provider.   |

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• • • • •  
**3-14** *Diagnostic Tools*

|  |      |                                  |   |
|--|------|----------------------------------|---|
| 1782-Disk Controller Failure                   | None | Hard disk drive circuitry error. | Run Diagnostics. Replace failed assembly as indicated or contact your service provider. |
| 1784-Drive Array Drive Failure, Physical Drive | None | Defective drive and/or cables.   | Check for loose cables. Replace defective drive <i>X</i> and/or cable(s).               |
| 1785-Drive Array not Configured                | None | Configuration error.             | Run the System Configuration Utility and correct.                                       |

*Continued*

POST Error Messages *Continued*

| Error Code  | Beeps | Probable Source of Problem  | Action   |
|---|-------|---|--|
| 1786-Drive Array Recovery Needed<br>The following drive(s) need Automatic Data Recovery: Drive <i>X</i> .<br>Select "F1" to continue with recovery of data to drive(s). Select "F2" to continue without recovery of data to drive(s). | None  | Interim Data Recovery mode. Data has not been recovered yet.  | Press <b>F1</b> key to allow Automatic Data Recovery to begin.<br>Data will automatically be restored to drive <i>X</i> now that the drive has been replaced or now seems to be working.<br>-Or-<br>Press the <b>F2</b> key and the system will continue to operate in the Interim Data Recovery mode. |
| 1787-Drive Array Operating in Interim Recovery Mode.<br>Physical drive replacement needed: Drive <i>X</i>   | None  | Hard drive <i>X</i> failed or cable is loose or defective. Following a system restart, this message reminds you that drive <i>X</i> is defective and fault tolerance is being used. | 1. Replace drive <i>X</i> as soon as possible.<br>2. Check loose cables.<br>3. Replace defective cables.   |
| *1788-Incorrect Drive Replaced:<br>Drive <i>X</i> Drive(s) were incorrectly replaced: Drive <i>Y</i><br>Select "F1" to continue - drive array will remain disabled. Select "F2" to reset configuration - all data will be lost.       | None  | Drives are not installed in their original positions, so the drives have been disabled.<br><i>See note below.</i>   | Reinstall the drives correctly as indicated.<br>Press <b>F1</b> to restart the computer with the drive array disabled.<br>-Or-<br>Press <b>F2</b> to use the drives as configured and lose all the data on them.   |

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### 3-16 *Diagnostic Tools*

**\*NOTE:** The 1788 error message might also be displayed inadvertently due to a bad power cable connection to the drive or by noise on the data cable. If this message was due to a bad power cable connection, but not due to an incorrect drive replacement, repair the connection and press **F2**.

-Or-

If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.

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*Continued*

**POST Error Messages** *Continued*

| Error Code   | Beeps | Probable Source of Problem   | Action   |
|--|-------|--|--|
| 1789-Drive Not Responding, Physical Drive<br>Check cables or replace physical drive X.<br>Select "F1" to continue - drive array will remain disabled.<br>Select "F2" to fail drive(s) that are not responding - Interim Recovery Mode will be enabled if configured for fault tolerance. | None  | Cable or hard drive failure.   | <ol style="list-style-type: none"> <li>1. Check the cable connections.</li> <li>2. If cables are connected, replace the drive.</li> <li>3. If you do not want to replace the drives now, press <b>F2</b>.</li> </ol> |
| 1790-Disk 0 Error  | None  | Hard drive error or wrong drive type.  | Run the System Configuration Utility and Diagnostics and correct.  |
| 1791-Disk 1 Error  | None  | Hard drive error or wrong drive type.  | Run the System Configuration Utility and Diagnostics and correct.  |
| 1792-Drive Array Reports Valid Data Found in Array Accelerator.<br>Data will automatically be written to drive array.  | None  | This indicates that while the system was in use, power was interrupted while data was in the Array Accelerator memory. Power was then restored within eight to ten days, and the data in the Array Accelerator was flushed to the drive array. | No action necessary; no data has been lost. Perform orderly system shutdowns to avoid data remaining in the Array Accelerator.   |

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**3-18** *Diagnostic Tools*

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|  |      |  |   |
|--|------|--|---|
| 1793-Drive Array -<br>Array Accelerator<br>Battery Depleted -<br>Data Lost<br>(Error message<br>1794 also displays.) | None | This indicates that while<br>the system was in use,<br>power was interrupted<br>while data was in the<br>Array Accelerator<br>memory.<br>Array Accelerator<br>batteries failed. Data in<br>Array Accelerator has<br>been lost. | Power was not restored<br>within eight to ten<br>days. Perform orderly<br>system shutdowns to<br>avoid data remaining<br>in the Array<br>Accelerator. |
|--|------|--|---|

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*Continued*

**POST Error Messages** *Continued*

| Error Code   | Beeps | Probable Source of Problem   | Action   |
|--|-------|--|--|
| 1794-Drive Array - Array Accelerator Battery Charge Low.<br>Array Accelerator is temporarily disabled.<br>Array Accelerator will be re-enabled when battery reaches full charge. | None  | This is a warning that the battery charge is below 75%. Posted writes are disabled.  | Replace the Array Accelerator board if batteries do not recharge within 36 power-on hours.   |
| 1795-Drive Array - Array Accelerator Configuration Error. Data does not correspond to this drive array. Array Accelerator is temporarily disabled.                               | None  | This indicates that while the system was in use, power was interrupted while data was in the Array Accelerator memory. The data stored in the Array Accelerator does not correspond to this drive array. | 1. Match the Array Accelerator to the correct drive array.<br>-Or-<br>2. Run the System Configuration Utility to clear the data in the Array Accelerator.              |
| 1796-Drive Array - Array Accelerator Not Responding. Array Accelerator is temporarily disabled.  | None  | Array Accelerator is defective or has been removed.  | 1. Check that the Array Accelerator is properly seated.<br>2. Run the System Configuration Utility to re-configure the array controller without the Array Accelerator. |
| 1797-Drive Array - Array Accelerator Read Error Occurred. Data in Array Accelerator has been lost. Array Accelerator is disabled.  | None  | Hard parity error while reading data from posted writes memory.  | Enable Array Accelerator.  |

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**3-20** *Diagnostic Tools*

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|  |      |   |                              |
|--|------|---|------------------------------|
| 1798-Drive Array -<br>Array Accelerator<br>Write Error<br>Occurred.<br>Array Accelerator<br>is disabled. | None | Hard parity error while<br>writing data to posted<br>writes memory. | Enable Array<br>Accelerator. |
|--|------|---|------------------------------|

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*Continued*



**POST Error Messages** *Continued*

| Error Code  | Beeps | Probable Source of Problem   | Action   |
|---|-------|--|--|
| 1799-Drive Array - Drive(s) Disabled due to Array Accelerator Data Loss. Select "F1" to continue with logical drives disabled. Select "F2" to accept data loss and to re-enable logical drives. | None  | Volume failed due to loss of data in posted-writes memory.                     | Press <b>F1</b> to continue with logical drives disabled or <b>F2</b> to accept data loss and re-enable logical drive. |
|   | 2L,2S | Power is cycled. Temperature too hot. Processor fan not installed or spinning. | Check fans.  |
| (Run System Configuration Utility = "F10" key)  | None  | A configuration error occurred during POST.                                    | Press <b>F10</b> to run System Configuration Utility.  |
| No keyboard present   | None  | None.  |  |
| Warning - Move bridge card in slot <i>x</i> to available slot 4, 5, 6 ( <i>x</i> = 1, 2, or 3)  | None  | Bridge card detected in slot 1, 2, or 3.                                       | Move bridge card to slot 4, 5, or 6.   |
| (RESUME = "F1" KEY)   | None  | As indicated to continue.  | Press the <b>F1</b> key.   |

## Diagnostics (DIAGS)

Diagnostic error codes occur if the system recognizes a problem while running the Diagnostics program. These error codes help identify possible defective subassemblies.

Tables 3-2 through 3-17 list possible error codes, a description of the error condition, and the action required to resolve the error condition.

In each case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code reappears, perform the next step, then run the Diagnostics program again. Follow this procedure until the Diagnostics program no longer detects an error condition.

If you encounter an error condition, complete the following steps before starting problem isolation procedures:

1. Ensure that there is proper ventilation. The computer should have approximately 12 inches (30.5 cm) clearance at the front and back of the system unit.
  2. Turn off the computer and peripheral devices.
  3. Disconnect any peripheral devices other than the monitor and keyboard. Do not disconnect the printer if you want to test it or use it to log error messages.
  4. Delete the power-on password, if set. You will know that the power-on password is set when a key icon appears on the screen when POST completes. If this occurs, you must enter the password to continue. To delete the password, type the current password and press the **Enter** key.
  5. If you do not have access to the password, you must disable the power-on password by using the Password Disable switch on the system board.
  6. When instructed by Diagnostics, install a loopback plug (Part Number 142054-001).
  7. Run the latest version of Diagnostics.
-

**Table 3-2**  
**Primary Processor Test Error Codes**

| <b>Error Code</b> | <b>Description</b>  | <b>Recommended Action</b>   |
|-------------------|---|---|
| 101-xx            | CPU test failed   | Replace the processor board and retest.   |
| 103-xx            | DMA page registers test failed                                  | For error codes 103-xx through 106-xx, replace the processor board and retest.  |
| 104-xx            | Interrupt controller master test failed                         |   |
| 105-xx            | Port 61 error   |   |
| 106-xx            | Keyboard controller self-test failed                            |   |
| 107-xx            | CMOS RAM test failed  | The following steps apply to error codes 107-xx through 109-xx.<br><br>1. Replace the battery/clock module and retest.<br><br>2. Replace the system board and retest. |
| 108-xx            | CMOS interrupt test failed                                      |   |
| 109-xx            | CMOS clock load data test failed                                |   |
| 110-xx            | Programmable timer load data test                               | For error codes 110-xx through 113-xx, replace the system board and retest.   |
| 111-xx            | failed  |   |
| 112-xx            | Refresh detect test failed                                      |   |
| 113-xx            | Speed test slow mode out of range<br>Protected mode test failed |   |
| 114-xx            | Speaker test failed   | 1. Verify the speaker connection and retest.<br><br>2. Replace the speaker and retest.<br><br>3. Replace the system board and retest.                                 |
| 116-xx            | Cache test failed   | Replace the system board and retest.  |

*Continued*

**Table 3-2 Primary Processor Test Error Codes** *Continued*

| Error Code | Description                   | Recommended Action  |
|------------|-------------------------------|---|
| 199-xx     | Installed devices test failed | <ol style="list-style-type: none"> <li>1. Check the system configuration and retest.</li> <li>2. Verify cable connections and retest.</li> <li>3. Check switch and/or jumper settings and retest.</li> <li>4. Run the Configuration utility and retest.</li> <li>5. Replace the processor board and retest.</li> <li>6. Replace the system board and retest.</li> </ol> |

**Table 3-3  
Memory Test Error Codes**

| Error Code | Description                       | Recommended Action  |
|------------|-----------------------------------|---|
| 200-xx     | Invalid memory configuration      | Reinsert memory modules in correct location and retest.   |
| 201-xx     | Memory machine ID test failed     | The following steps apply to error codes 201-xx and 202-xx: <ol style="list-style-type: none"> <li>1. Replace the system ROM and retest.</li> <li>2. Replace the processor board and retest.</li> <li>3. Replace the memory expansion board and retest.</li> </ol>        |
| 202-xx     | Memory system ROM checksum failed |   |
| 203-xx     | Memory write/read test failed     | The following steps apply to error codes 203-xx through 210-xx: <ol style="list-style-type: none"> <li>1. Replace the memory module and retest.</li> <li>2. Replace the processor board and retest.</li> <li>3. Replace the memory expansion board and retest.</li> </ol> |
| 204-xx     | Memory address test failed        |   |
| 205-xx     | Walking I/O test failed           |   |
| 206-xx     | Increment pattern test failed     |   |
| 210-xx     | Random pattern test failed        |   |

**Table 3-4**  
**Keyboard Test Error Codes**

| Error Code | Description                                | Recommended Action   |
|------------|--|--|
| 301-xx     | Keyboard short test, 8042 self-test failed | <p>The following steps apply to error codes 301-xx through 304-xx:</p> <ol style="list-style-type: none"> <li>1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard and retest.</li> <li>2. Replace the keyboard and retest.</li> <li>3. Replace the system board and retest.</li> </ol> |
| 302-xx     | Keyboard long test failed                  |  |
| 303-xx     | Keyboard LED test, 8042 self-test failed   |  |
| 304-xx     | Keyboard typematic test failed             |  |

**Table 3-5**  
**Parallel Printer Test Error Codes**

| Error Code | Description                     | Recommended Action   |
|------------|---------------------------------|--|
| 401-xx     | Printer failed or not connected | <p>The following steps apply to error codes 401-xx through 498-xx:</p> <ol style="list-style-type: none"> <li>1. Connect the printer and retest.</li> <li>2. Check the power to the printer and retest.</li> <li>3. Install the loopback connector and retest.</li> <li>4. Check the switch on the Serial/Parallel Interface board (if applicable) and retest.</li> <li>5. Replace the Serial/Parallel Interface board (if applicable) and retest.</li> <li>6. Replace the system board and retest.</li> </ol> |
| 402-xx     | Printer data register failed    |  |
| 403-xx     | Printer pattern test failed     |  |
| 498-xx     | Printer failed or not connected |  |

**Table 3-6**  
**Video Display Unit Test Error Codes**

| Error Code | Description  | Recommended Action  |
|------------|--|---|
| 501-xx     | Video controller test failed                         | The following steps apply to error codes 501-xx through 516-xx:<br><br>1. Replace the monitor and retest.<br><br>2. Replace the Advanced VGA board and retest.<br><br>3. Replace the system board and retest. |
| 502-xx     | Video memory test failed                             |   |
| 503-xx     | Video attribute test failed                          |   |
| 504-xx     | Video character set test failed                      |   |
| 505-xx     | Video 80 x 25 mode 9 x 14 character cell test failed |   |
| 506-xx     | Video 80 x 25 mode 8 x 8 character cell test failed  |   |
| 507-xx     | Video 40 x 25 mode test failed                       |   |
| 508-xx     | Video 320 x 200 mode color set 0 test failed         |   |
| 509-xx     | Video 320 x 200 mode color set 1 test failed         |   |
| 510-xx     | Video 640 x 200 mode test failed                     |   |
| 511-xx     | Video screen memory page test failed                 |   |
| 512-xx     | Video gray scale test failed                         |   |
| 514-xx     | Video white screen test failed                       |   |
| 516-xx     | Video noise pattern test failed                      |   |

**Table 3-7**  
**Diskette Drive Error Test Codes**

| Error Code | Description                                | Recommended Action   |
|------------|--|--|
| 600-xx     | Diskette ID drive types test failed        | The following steps apply to error codes 600-xx through 698-xx:<br>1. Replace the diskette and retest.<br>2. Check and/or replace the diskette power and signal cables and retest.<br>3. Replace the diskette drive and retest.<br>4. Replace the system board and retest. |
| 601-xx     | Diskette format failed                     |  |
| 602-xx     | Diskette read test failed                  |  |
| 603-xx     | Diskette write/read/compute test failed    |  |
| 604-xx     | Diskette random seek test failed           |  |
| 605-xx     | Diskette ID media failed                   |  |
| 606-xx     | Diskette speed test failed                 |  |
| 607-xx     | Diskette wrap test failed                  |  |
| 608-xx     | Diskette write protect test failed         |  |
| 609-xx     | Diskette reset controller test failed      |  |
| 610-xx     | Diskette change line test failed           |  |
| 694-xx     | Pin 34 is not cut on 360 KB diskette drive |  |
| 697-xx     | Diskette type error                        |  |
| 698-xx     | Diskette drive speed not within limits     |  |
| 699-xx     | Diskette drive/media ID error              |  |
|            |  | The following steps apply to 699-xx error codes:<br>1. Replace the media and retest.<br>2. Run the Configuration utility and retest.   |

**Table 3-8**  
**Monochrome Video Board Test Error Codes**

| Error Code | Description                            | Recommended Action   |
|------------|--|--|
| 802-xx     | Video memory test failed               | The following steps apply to error codes 802-xx and 824-xx:<br>1. Replace monitor and retest.<br>2. Replace the Advanced VGA board and retest.<br>3. Replace monochrome board and retest.<br>4. Replace the system board and retest. |
| 824-xx     | Monochrome video text mode test failed |  |

**Table 3-9**  
**Serial Test Error Codes**

| Error Code | Description                | Recommended Action  |
|------------|----------------------------|---|
| 1101-xx    | Serial port test failed    | The following steps apply to error codes 1101-xx and 1109-xx:<br>1. Check the switch settings on the Serial/Parallel Interface board (if applicable) and retest.<br>2. Replace the Serial/Parallel Interface board (if applicable) and retest.<br>3. Replace the system board and retest. |
| 1109-xx    | Clock register test failed |   |

**Table 3-10**  
**Modem Communications Test Error Codes**

| Error Code | Description                            | Recommended Action   |
|------------|--|--|
| 1201-xx    | Modem internal loopback test failed    | The following steps apply to error codes 1201-xx through 1210-xx:<br>1. Refer to the modem documentation for correct setup procedures and retest.<br>2. Check the modem line and retest.<br>3. Replace the modem and retest. |
| 1202-xx    | Modem time-out test failed             |  |
| 1203-xx    | Modem external termination test failed |  |
| 1204-xx    | Modem auto originate test failed       |  |
| 1206-xx    | Dial multi-frequency tone test failed  |  |
| 1210-xx    | Modem direct connect test failed       |  |



**Table 3-11**  
**Fixed Disk Drive Test Error Codes**

| Error Code                      | Description                               | Recommended Action  |
|---------------------------------|---|---|
| 1700-xx                         | Fixed disk ID drive types test failed     | The following steps apply to error codes 1700-xx through 1799-xx:<br><br>1. Run the Configuration Utility and verify the drive type.<br><br>2. Replace the fixed disk drive signal and power cables and retest.<br><br>3. Replace the fixed disk drive controller and retest.<br><br>4. Replace the fixed disk drive and retest.<br><br>5. Replace the system board and retest. |
| 1701-xx                         | Fixed disk format test failed             |   |
| 1702-xx                         | Fixed disk read test failed               |   |
| 1703-xx                         | Fixed disk write/read/compare test failed |   |
| 1704-xx                         | Fixed disk random seek test failed        |   |
| 1705-xx                         | Fixed disk controller test failed         |   |
| 1708-xx                         | Fixed disk format bad track test failed   |   |
| 1709-xx                         | Fixed disk reset controller test failed   |   |
| 1710-xx                         | Fixed disk park head test failed          |   |
| 1715-xx                         | Fixed disk head select test failed        |   |
| 1716-xx                         | Fixed disk conditional format test failed |   |
| 1717-xx                         | Fixed disk ECC* test failed               |   |
| 1719-xx                         | Fixed disk drive power mode test failed   |   |
| 1736-xx                         | Drive Monitoring failed                   |   |
| 1799-xx                         | Invalid fixed disk drive type failed      |   |
| * Error Checking and Correcting |   |   |

**Table 3-12**  
**CD-ROM Drive Test Error Codes**

| Error Code | Description | Recommended Action |
|------------|-------------|--------------------|
|------------|-------------|--------------------|

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|---------|---------------------------|--|
| 1800-xx | CD-ROM ID failed          | The following steps apply to error codes 1800-xx through 1823-xx:<br><ol style="list-style-type: none"><li>1. Replace the CD-ROM and retest.</li><li>2. Check and/or replace the signal cable and retest.</li><li>3. Check the switch settings on the adapter board (if applicable).</li><li>4. Replace the tape adapter board (if applicable) and retest.</li><li>5. Replace the CD-ROM drive and retest.</li><li>6. Replace the system board and retest.</li></ol> |
| 1803-xx | CD-ROM Power failed       |  |
| 1805-xx | CD-ROM Read failed        |  |
| 1806-xx | CD-ROM SA/Media failed    |  |
| 1808-xx | CD-ROM Controller failed  |  |
| 1823-xx | CD-ROM random read failed |  |

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**Table 3-13**  
**Tape Drive Test Error Codes**

| <b>Error Code</b> | <b>Description</b>                  | <b>Recommended Action</b>  |
|-------------------|-------------------------------------|--|
| 1900-xx           | Tape ID failed                      | The following steps apply to error codes 1900-xx through 1906-xx:<br><ol style="list-style-type: none"><li>1. Replace the tape cartridge and retest.</li><li>2. Check and/or replace the signal cable and retest.</li><li>3. Check the switch settings on the adapter board (if applicable).</li><li>4. Replace the tape adapter board (if applicable) and retest.</li><li>5. Replace the tape drive and retest.</li><li>6. Replace the system board and retest.</li></ol> |
| 1901-xx           | Tape servo write failed             |  |
| 1902-xx           | Tape format failed                  |  |
| 1903-xx           | Tape drive sensor test failed       |  |
| 1904-xx           | Tape BOT/EOT test failed            |  |
| 1905-xx           | Tape read test failed               |  |
| 1906-xx           | Tape write/read/compare test failed |  |

**Table 3-14**  
**Advanced VGA Board Test Error Codes**

| Error Code | Description  | Recommended Action  |
|------------|--|---|
| 2402-xx    | Video memory test failed                             | The following steps apply to error codes 2402-xx through 2456-xx:<br>1. Run the Configuration utility.<br>2. Replace the monitor and retest.<br>3. Replace the Advanced VGA board or other video board and retest.<br>4. Replace the system board and retest. |
| 2403-xx    | Video attribute test failed                          |   |
| 2404-xx    | Video character set test failed                      |   |
| 2405-xx    | Video 80 x 25 mode 9 x 14 character cell test failed |   |
| 2406-xx    | Video 80 x 25 mode 8 x 8 character cell test failed  |   |
| 2407-xx    | Video 40 x 25 mode test failed                       |   |
| 2408-xx    | Video 320 x 320 mode color set 0 test failed         |   |
| 2409-xx    | Video 320 x 320 mode color set 1 test failed         |   |
| 2410-xx    | Video 640 x 200 mode test failed                     |   |
| 2411-xx    | Video screen memory page test failed                 |   |
| 2412-xx    | Video gray scale test failed                         |   |
| 2413-xx    | Video white screen test failed                       |   |
| 2414-xx    | Video noise pattern test failed                      |   |
| 2415-xx    | Lightpen text mode test failed, no response          |   |
| 2416-xx    | ECG/VGC memory test failed                           |   |
| 2417-xx    | ECG/VGC ROM checksum test failed                     |   |
| 2418-xx    | ECG/VGC attribute test failed                        |   |
| 2419-xx    | ECG/VGC 640 x 200 graphics mode test failed          |   |
| 2420-xx    | ECG/VGC 640 x 350 16-color set test failed           |   |
| 2421-xx    | ECG/VGC 640 x 350 64-color test failed               |   |
| 2422-xx    | ECG/VGC monochrome text mode test failed             |   |
| 2423-xx    | ECG/VGC monochrome graphics mode test failed         |   |
| 2424-xx    | 640 x 480 graphics test failure                      |   |
| 2425-xx    | 320 x 200 graphics (256-color mode) test failure     |   |
| 2426-xx    | Advanced VGA Controller test failed                  |   |
| 2427-xx    | 132-column Advanced VGA test failed                  |   |
| 2428-xx    | Advanced VGA 256-Color test failed                   |   |

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|         |                             |   |
|---------|-----------------------------|---|
| 2458-xx | Advanced VGA Bit BLT Test   | The following steps apply to error codes 2458-xx through 2480-xx:<br>1. Run Setup.<br>2. Replace the system board and retest. |
| 2468-xx | Advanced VGA DAC Test       |   |
| 2477-xx | Advanced VGA Data Path Test |   |
| 2480-xx | Advanced VGA DAC Test       |   |

**Table 3-15**  
**NetFlex-2 ENET-TR Controller and**  
**NetFlex-2 Token Ring Controller Test Error Codes**

| Error Code | Description                       | Recommended Action  |
|------------|-----------------------------------|---|
| 6000-xx    | Network card ID failed            | <p>The following steps apply to error codes 6000-xx through 6089-xx:</p> <ol style="list-style-type: none"> <li>1. Check the controller installation in the EISA slot.</li> <li>2. Check the interrupt type and number setting.</li> <li>3. Check the media connection at the controller and MAU*.</li> <li>4. Check the media speed (4/16 ) and type (UTP/STP**) settings.</li> <li>5. Check the MAU, cabling, or other network components.</li> <li>6. Replace the controller.</li> </ol> |
| 6001-xx    | Network card setup failed         |   |
| 6002-xx    | Network card transmit failed      |   |
| 6014-xx    | Network card Configuration failed |   |
| 6016-xx    | Network card Reset failed         |   |
| 6028-xx    | Network card Internal failed      |   |
| 6029-xx    | Network card External failed      |   |
| 6089-xx    | Network card Open failed          |   |
|            |                                   | * MAU = Multistation Access Unit  |
|            |                                   | ** UTP/STP = Unshielded Twisted Pair/Shielded Twisted Pair.   |

**Table 3-16**  
**Server Manager/R Board Test Error Codes**

| Error Code | Description                  | Recommended Action   |
|------------|------------------------------|--|
| 7000-11    | Processor (80186 Timer)      | Replace the Server Manager/R board and retest for error codes 7000-11 through 7000-27.                                     |
| 7000-12    | Processor (80186 Registers)  |  |
| 7000-13    | Processor (Watch Dog Timer)  |  |
| 7000-14    | Processor (8570 RAM)         |  |
| 7000-15    | Processor (8570 RTC)         |  |
| 7000-21    | Memory                       |  |
| 7000-22    | Memory Write/Read            |  |
| 7000-23    | Memory Address               | Replace the Server Manager/R board and retest for error codes 7000-28 through 7000-46.                                     |
| 7000-24    | Memory Refresh Alert         |  |
| 7000-25    | Memory Increment             |  |
| 7000-26    | Memory Random Data           |  |
| 7000-27    | Memory Disturb Address       |  |
| 7000-28    | Memory HBM                   |  |
| 7000-33    | HBM IO                       |  |
| 7000-34    | HBM BMIC                     |  |
| 7000-35    | HBM Video                    | Replace the Server Manager/R board Enhanced 2400-Baud Integrated Modem and retest for error codes 7000-51 through 7000-57. |
| 7000-41    | ser_int                      |  |
| 7000-42    | ser_int                      |  |
| 7000-43    | ser_ext                      |  |
| 7000-44    | ser_ext                      |  |
| 7000-45    | ser_ext_int                  |  |
| 7000-46    | ser_ext_int                  |  |
| 7000-51    | mdm_int                      | Replace the Server Manager/R board Voice ROM for 7000-61 and 7000-62 error codes.  |
| 7000-52    | mdm_int                      |  |
| 7000-53    | mdm_ext                      |  |
| 7000-54    | mdm_ext                      |  |
| 7000-55    | mdm_ext_int                  |  |
| 7000-56    | mdm_ext_int                  |  |
| 7000-57    | mdm\c\analog                 |  |
| 7000-61    | Voice/DTMF Internal Loopback | Replace the Server Manager/R board battery for 7000-78 and 7000-79 error codes.  |
| 7000-62    | Voice/DTMF Internal Loopback |  |
| 7000-78    | Host ADC Measurements        | Replace the Server Manager/R board battery for 7000-78 and 7000-79 error codes.  |
| 7000-79    | Battery                      |  |

Table 3-17  
Pointing Device Interface Test Error Codes

| Error Code | Description                           | Recommended Action   |
|------------|---------------------------------------|--|
| 8601-xx    | Pointing Device Interface test failed | The following steps apply for 8601-xx error codes:<br>1. Replace with a working pointing device and retest.<br>2. Replace the system board and retest. |

## Drive Array Advanced Diagnostics (DAAD)

Drive Array Advanced Diagnostics (DAAD) is a DOS-based tool designed to run on all Compaq products that contain a Smart SCSI Array Controller using Fast-SCSI-2 Drives. The error messages and codes listed include all codes generated by Compaq products. Your system will generate only those codes that are applicable to your configuration and options. The two main functions of DAAD are to collect all possible information about the array controllers in the system and to offer a list of all detected problems.

**NOTE:** Refer to the *Drive Array Advanced Diagnostics User Guide* for complete details and procedures about this diagnostic tool.

DAAD works by issuing multiple commands to the array controllers to determine if a problem exists. This data can then be saved to a file and, for severe situations, this file can be sent to Compaq for analysis. In most cases, DAAD will provide enough information to initiate problem resolution immediately.

**NOTE:** DAAD does not write to the drives or destroy data. It does not change or remove configuration information.



## Starting DAAD

To start DAAD:

1. Insert the DAAD diskette into drive A and reboot the system. If you are at the DOS prompt, enter the following:

A:DAAD

2. A dialog box displays indicating the version of DAAD installed. Press the **Enter** key to continue, or press the **Esc** key to exit without continuing.
3. If you continue, a Please Wait panel displays indicating that DAAD is identifying the system parameters.

DAAD gathers all the information it can from all of the array controllers in the system. The time it takes to gather this information depends on the size of your system.



**CAUTION:** Do not cycle the power because the utility must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

4. Another Please Wait panel displays to indicate that the utility is identifying the ROM version. When this is complete, the main DAAD screen displays.

**NOTE:** To generate a DAAD report without starting the interactive portion of the utility, at the DOS prompt enter the following:

DAAD *filename*

where *filename* is the name of the file or report.

## DAAD Diagnostic Messages

The following is a description of the diagnostic messages that may be displayed in the dialog box of the Diagnosis menu. Included with each message is a probable cause and a probable solution or troubleshooting routine.

To view the problems detected by DAAD, select the Diagnosis button. If DAAD found no problems, a message, "No Problems Detected," will display.

### Accelerator board not detected

The array controller board did not detect the presence of a configured array accelerator board.

Install an array accelerator board onto the array controller. If you have an array accelerator board installed, check the seating to ensure that it has been properly installed onto the array controller board. You may need to run the Compaq System Configuration Utility and disable the array accelerator board to get this message off the screen.

### **Accelerator error log**

This is a list of the last 32 parity errors on transfers between the array controller board transfer buffer and memory on the array accelerator board. The starting memory address, transfer count, and operation (read and write) displays.

If there are a number of these parity errors, you may need to replace the array accelerator board.

### **Accelerator parity read errors: *n***

This message displays the number of times that read memory parity errors were detected during transfers between the array controller board transfer buffer and memory on the array accelerator board.

If there are a number of these parity errors, you may need to replace the array accelerator board.

### **Accelerator parity write errors: *n***

This message displays the number of times that write memory parity errors were detected during transfers between the array controller board transfer buffer and memory on the array accelerator board.

If there are a number of these parity errors, you may need to replace the array accelerator board.

### **Accelerator status: Permanently disabled**

The array accelerator board has been permanently disabled. It will remain disabled until it is reinitialized using the System Configuration Utility.

Check the Disable Code field. Run the System Configuration Utility to reinitialize the array accelerator board.

### **Accelerator status: Possible data loss in cache**

Possible data loss was detected during power-up due to all of the batteries being below the sufficient voltage level and no presence of the identification signatures on the array accelerator board.

There is no way to determine if dirty or bad data was in the cache and is now lost.

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**Accelerator status: Temporarily disabled**

The array accelerator board has been temporarily disabled.

Check the Disable Code field.

**Accelerator status: Unrecognized status**

A status returned from the array accelerator board that DAAD does not recognize.

Call your Authorized Compaq Reseller for the latest copy of DAAD.

**Accelerator status: Valid data found at reset**

Valid data was found in the posted write memory at re-initialization. The data will be flushed to disk.

This is *not* an error or data loss condition. No action needs to be taken.

**Accelerator status: Warranty alert**

A catastrophic problem has occurred with the array accelerator board. Refer to the other messages on the Diagnostics screen for the exact meaning of this message.

Replace the array accelerator board.

**Battery pack X below reference voltage**

The indicated battery pack is below the required voltage levels.

Allow sufficient time for the batteries to recharge (36 hours). If the batteries have not recharged after 36 hours, replace the battery pack.

**Battery X not fully charged**

The battery is not fully charged.

If 75% of the batteries present are fully charged, the array accelerator is fully operational. If more than 75% of the batteries are *not* fully charged, allow 36 hours to recharge them.

**Board not attached**

The array controller board has been configured for use with an array accelerator board, but one is currently not attached.

Locate the original array accelerator board and attach it to the array controller board.

### **CMOS present, controller not detected**

EISA nonvolatile RAM has a configuration for an array controller but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot.

Place the array controller in the proper slot or run the System Configuration Utility to re-configure nonvolatile RAM to reflect the removal or new position.

### **Compatibility port problem detected**

You have the compatibility port configured for this array controller. When DAAD was verifying this interface, a serious problem was detected.

A hardware problem has occurred and you should replace the array controller.

### **Configuration signature is zero**

DAAD detected that nonvolatile RAM contains a configuration signature that is zero. Old versions of the System Configuration Utility could cause this.

Run the latest version of System Configuration Utility to configure the controller and nonvolatile RAM.

### **Configuration signature mismatch**

The array accelerator board has been configured for a different array controller board. The configuration signature on the array accelerator board does not match the one stored on the array controller board.

To recognize the array accelerator board, run the System Configuration Utility.

### **Controller communication failure occurred**

DAAD was unable to successfully issue commands to the controller in this slot.

### **Controller detected. CMOS not present**

The EISA nonvolatile RAM is not configured.

Run the System Configuration Utility to configure the nonvolatile RAM.

### **Controller firmware needs upgrading**

The controller firmware is below the latest recommended version.

Call your Authorized Compaq Reseller to obtain the latest upgraded firmware.

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### Controller firmware needs upgrading (DAAD Error 102)

You have the correct controller; however, the array controller firmware version should be greater than 1.26.

Call your Authorized Compaq Reseller to obtain the latest firmware.

### Controller is not configured

The controller is not configured. If the controller was previously configured and you change drive locations, there may be a problem with the placement of the drives. DAAD examines each physical drive and looks for drives that have been moved to a different drive bay.

Look for the messages that indicate which drives have been moved. If none appear and drive swapping did not occur, run the System Configuration Utility to configure the controller and nonvolatile RAM. *Do not* run the System Configuration Utility if you believe drive swapping has occurred.

### Controller needs replacing (DAAD Error 102)

The array controller firmware is less than version 0.96.

Replace the controller as soon as possible.

### Controller needs replacing (DAAD Error 104)

The Intelligent Array Expansion System firmware is less than version 1.14.

Replace the controller as soon as possible.

### Controller reported POST error. Error Code: x

The controller returned an error from its internal Power-On Self-Tests.

Replace the controller.

### Controller restarted with a signature of zero

DAAD did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller.

Run the System Configuration Utility to configure the controller and nonvolatile RAM.

**Disable command issued**

Posted writes have been disabled by the issuing of the Accelerator Disable command. This occurred because of an operating system device driver.

Restart the system. Run the System Configuration Utility to reinitialize the array accelerator board.

**Drive (bay) X needs replacing (DAAD Error 102)**

The 210-megabyte hard drive installed in the computer has firmware version 2.30 or 2.31.

Replace the drive.

**Drive Monitoring features are unattainable**

DAAD was unable to get the monitor and performance data due to a fatal command problem such as drive time-out, or was unable to get the data due to these features not being supported on the controller.

Check for other errors (for example, time-outs). If no other errors occur, upgrade the firmware to a version that supports monitor and performance, if desired.

**Drive Monitoring is NOT enabled for drive bay X**

The monitor and performance features have not been enabled.

Run the Compaq Diagnostics Utility 8.05 or higher to initialize the monitor and performance features.

**Drive time-out occurred on physical drive bay X**

DAAD issued a command to a physical drive and the command was never acknowledged.

The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution.

**Drive (bay) X firmware needs upgrading**

The firmware on this physical drive is below the latest recommended version.

Call your Authorized Compaq Reseller to obtain the latest upgraded firmware.

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**Drive (bay) X has invalid M&P stamp**

The physical drive has invalid monitor and performance data present.

Run the latest Compaq Diagnostics Utility to properly initialize this drive.

**Drive X indicates position Y**

This message indicates a physical drive is not in the drive bay for which it was originally configured (that is, the drive is not in the correct location).

Examine the graphical drive representation on DAAD to determine proper drive locations. Remove drive X and place it in drive position Y. Rearrange the drives according to the DAAD instructions.

**Drive (bay) X RIS copy mismatch**

The copies of the RIS on this drive do not match.

This drive may need to be replaced. Check for other errors.

**Drive (bay) X upload code not readable**

An error occurred while DAAD was trying to read the upload code information from this drive.

If there were multiple errors, this drive may need to be replaced.

**Duplicate write memory error**

Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This is *not* a data loss situation.

Replace the array accelerator board.

**Error occurred reading RIS copy from drive (bay) X**

An error occurred while DAAD was trying to read the RIS from this drive.

If there were multiple errors, this drive may need to be replaced.

**FYI: Drive (bay) X is non-Compaq supplied**

The installed drive was not supplied by Compaq.

If problems exist with this drive, replace it with a Compaq drive.

### **Identify controller data did not match with CMOS**

The identify controller data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. This situation could also occur if the firmware on the controller has been upgraded and the System Configuration Utility was not run.

Check the identify controller data under the Inspect Utility. If the firmware version field is the only thing different between the controller and nonvolatile RAM data, this is not a problem. Otherwise run the System Configuration Utility.

### **Identify logical drive data did not match with CMOS**

The identify unit data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured.

Run the System Configuration Utility to configure the controller and nonvolatile RAM.

### **Insufficient adapter resources**

The adapter does not have sufficient resources to perform operations to the array accelerator board. Drive rebuild may be occurring.

Operate the system without the array accelerator board until the drive rebuild completes.

### **Less than 75% batteries at sufficient voltage**

The operation of the array accelerator board has been disabled due to less than 75% of the battery packs being at the sufficient voltage level.

Allow sufficient time for the batteries to recharge (36 hours). If the batteries have not recharged after 36 hours, replace the array accelerator board.

### **Logical drive X failed due to cache error**

This logical drive failed due to a catastrophic cache error.

Replace the array accelerator board and re-configure using the System Configuration Utility.

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### Logical Drive X status = FAILED

This status could be issued for several reasons. If this logical drive is configured for No Fault Tolerance and one or more drives fail, this status will occur. If mirroring is enabled, and any two mirrored drives fail, this status will occur. If Data Guarding is enabled, and two or more drives fail in this unit, this status will occur. This status may also occur if another configured logical drive is in the WRONG DRIVE REPLACED or LOOSE CABLE DETECTED state.

Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive(s) and then restore the data for this logical drive from the tape backup. Otherwise, follow the wrong drive replaced or loose cable detected procedures.

### Logical Drive X status = INTERIM RECOVERY

A physical drive in this logical drive has failed. The logical drive is operating in interim recovery mode and is vulnerable.

Replace the failed drive as soon as possible.

### Logical Drive X status = LOOSE CABLE DETECTED

A physical drive has a cabling problem.

Turn the system off and attempt to reattach the cable onto the drive. If this does not work, replace the cable.

### Logical Drive X status = NEEDS RECOVER

A physical drive in this logical drive has failed and has now been replaced. This drive needs to be rebuilt from the mirror drive or the parity data.

When booting up the system, select the *F1 - rebuild drive* option to rebuild the replaced drive.

### Logical Drive X status = OVERHEATED

The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels and it has shut down to avoid damage.

Check the fans and the operating environment.

### Logical Drive X status = OVERHEATING

The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels.

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Check the fans and the operating environment.

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### Logical Drive X status = RECOVERING

A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data.

Nothing needs to be done. Normal operations can occur.

### Logical Drive X status = WRONG DRIVE REPLACED

A physical drive in this logical drive has failed. The incorrect drive was replaced.

Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. *Do not* run the System Configuration Utility to reconfigure—you will lose data on the drive.

### Mirror data miscompare

Data was found at re-initialization in the posted write memory, however, the mirror data compare test failed resulting in data being marked as invalid. Data loss is possible.

Replace the array accelerator board.

### Mirrored memory location errors

Soft errors occurred when attempting to read the same data from both sides of the mirrored memory. Data loss will occur.

Replace the array accelerator board.

### No configuration for Accelerator Board

The array accelerator board has not been configured.

If the array accelerator board is present, run the System Configuration Utility to configure the board.

### Physical Drive (bay) X error occurred

This message displays detailed information on any drive errors that were returned to DAAD while issuing drive commands.

Check for other error conditions.

**Physical drive (bay) X has loose cable**

The array controller could not communicate with this drive at power-up. This drive has not previously failed.

Check all cable connections first. The cables could be bad, loose, or disconnected. Turn on the system and attempt to reconnect data/power cable to the drive. If this does not work, replace the cable. If replacing the cable does not work, the drive may need to be replaced.

**Physical drive (bay) X is a replacement drive**

This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume.

If the replacement was intentional, allow the drive to rebuild.

**Physical drive (bay) X is a replacement drive marked OK**

This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure (for example, if a drive has previously failed, then when DAAD is run, the drive starts working again).

Replace the drive.

**Physical drive (bay) X has failed**

The indicated physical drive has failed.

Replace this drive.

**Physical drive (bay) X is undergoing drive recovery**

This drive is being rebuilt from the corresponding mirror or parity data.

Normal operations should occur.

**Physical drive (bay) X was inadvertently replaced**

The physical drive was incorrectly replaced after another drive failed.

Replace the drive that was incorrectly replaced and replace the original drive that failed. Do not run the System Configuration Utility and try to reconfigure – data will be lost.

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### **Set configuration command issued**

The configuration of the array controller has been updated. The array accelerator board remains disabled until it is reinitialized.

Run the System Configuration Utility to reinitialize the array accelerator board.

### **Soft Firmware Upgrade required**

DAAD has determined that your controller is running firmware that has been soft upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This could be caused by the addition of new drives in the system.

Run the Compaq Upgrade Utility to place the latest firmware on all drives.

### **Threshold for drive (bay) X violated**

This message indicates that a monitor and performance threshold for this drive has been violated.

Check for the particular threshold that has been violated.

### **Threshold violations for drive (bay) X**

This is a list of the individual thresholds that have been violated for this drive.

The drive may need to be replaced. Run the Compaq Diagnostics Utility to determine if the drive has been initialized and the threshold violation warrants drive replacement.

### **Unknown disable code**

A code was returned from the array accelerator board that DAAD does not recognize.

Call your Authorized Compaq Reseller for the latest version of DAAD.

### **Warning bit detected**

A monitor and performance threshold violation may have occurred. The status of a logical drive may not be OK.

Check the other error messages for an indication of the problem.

### Wrong Accelerator

This could mean that either the board was replaced in the wrong slot or placed in a system that was previously configured with another board type. Included with this message is a message indicating the type of adapter sensed by DAAD and a message indicating the type of adapter last configured in EISA nonvolatile RAM.

Check the diagnosis screen for other error messages. Run the System Configuration Utility to update the system configuration.

## Rapid Recovery Services

The Compaq ProLiant provides rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery. The following topics are discussed here:

- Automatic Server Recovery (ASR)
- Server Health Logs
- System Configuration History Files

### Automatic Server Recovery

The Automatic Server Recovery (ASR) feature can be enabled to restart a Server after a critical hardware error or software error has occurred. If a critical error occurs, the Server will record the error information in the Server Health Logs, reboot the system, and initiate a call to a pager. The system can be configured for either automatic recovery or for attended local or remote access to diagnostic and configuration tools.

**NOTE:** ASR is available only under operating systems using the ASR drivers provided by Compaq.

The following chart explains how ASR works:

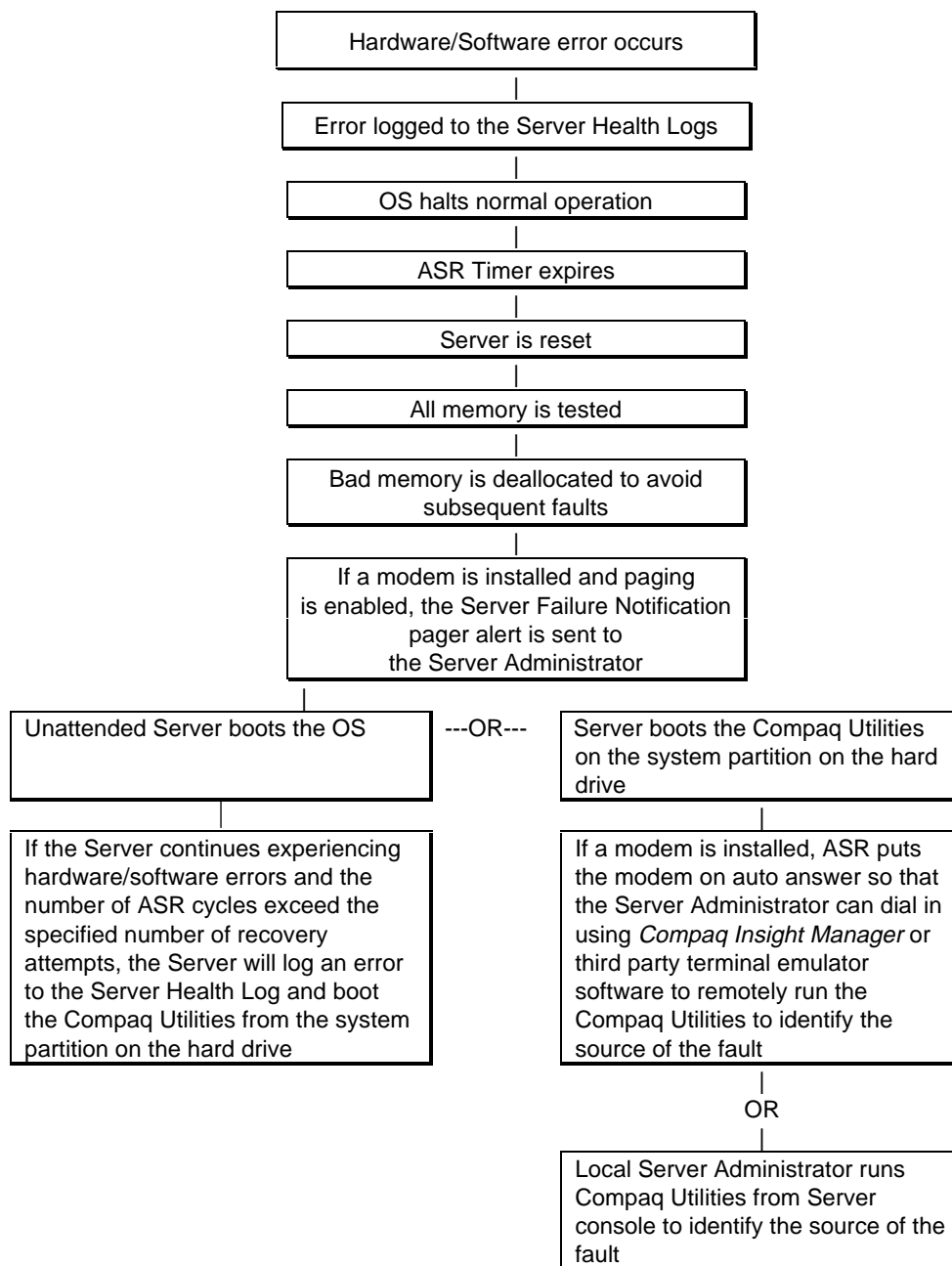


Figure 3-1. Automatic Server Recovery

## Configuring the Server for Automatic Server Recovery (ASR)

When setting up the Server to use Automatic Server Recovery (ASR), you must set the ASR Timer, select the pager number to call, specify how you want the Server to recover from critical system faults, and specify when to monitor. This selection process is accomplished through the SmartStart installation process and can be modified through the Compaq System Configuration Utility.

The ASR depends on an operating system driver that routinely notifies the ASR hardware that the system is operating properly. You should set the ASR Timer to allow the ASR to wait a reasonable period of time before resetting the system and activating the recovery process after a fault occurs. If the time between ASR notifications by the driver exceeds the specified time period, it will assume a fault has occurred and initiate the recovery process.

For example, if the ASR Timer is set to 10 minutes, the system will not reset the Server unless 10 minutes elapses with no notification from the driver that the system is operating properly.

You can select to be paged (modem required) and what mode the Server will be in when it restarts after a critical error. The following sections describe the different reboot options and the system requirements for each level.

### Unattended Recovery

For unattended recovery, ASR will log the error information to the Critical Error Log, reset the Server, test all memory, automatically de-allocate any bad memory blocks found, page you (if modem is present and paging is selected), and attempt to reboot the operating system. Often the Server will restart successfully, making this the ideal choice for remote locations where trained service personnel are not immediately available.

The ASR will only attempt the recovery process a limited number of times. If the Server continues to experience hardware/software errors and the number of recovery cycles exceeds the retry limit, the Server will log an error to the Critical Error Log and continue to boot the Compaq Utilities from the hard drive.

The requirements to use this level of the ASR feature are:

- Operating System with ASR support
  - ASR configured to load the operating system after reboot
  - Optional Hayes-compatible modem (only required for paging)
-



## Attended Recovery

For local or remote installations where it is desirable to supervise the recovery, ASR will log the error information to the Critical Error Log, reset the Server, test all memory, automatically de-allocate any bad memory blocks found, page you, boot the Compaq Utilities from the hard drive, and place the modem in auto answer mode. These utilities are placed on a special system utilities partition on the hard drive during the system configuration process. If a modem with an auto-answer feature is installed, you can dial in and remotely diagnose or re-configure the Server; otherwise, this can be done from the Server console. The requirements to use this level of the ASR feature are:

- Operating System with ASR support
- System Configuration Utility and Diagnostics Utility installed on the system partition of the hard drive
- ASR configured to load the Compaq Utilities after reboot
- Optional Hayes-compatible modem with auto-answer feature (only required for remote operations and paging)

For remote operations, the administrator must have access to Compaq Insight Manager or a communications software package capable of terminal emulation to a local terminal with VT100 or ANSI terminal capabilities.

**NOTE:** If the remote site is using something other than VT100 or an ANSI terminal emulator, it is still possible to configure remotely as long as the package contains either an ANSI terminal or VT100 terminal emulator set for 8 data bits, 1 stop bit, and no parity. However, additional setup not outlined in this document may be required, and functionality may be reduced.

## ASR Security

The standard Compaq ProLiant security password features function differently during ASR than during a typical system startup.

During ASR the system will not prompt for the Power-On Password. This allows the ASR to restart the Operating System or Compaq Utilities without user intervention.

To maintain system security, the Server should be set to boot in Network Server Mode (an option in the System Configuration Utility). This option ensures that the Server keyboard is locked until you enter the Keyboard Password.

You should also select an Administrator Password (an option in the System Configuration Utility). During attended ASR (local or remote), you must enter this Administrator Password before any modifications can be made to the Server configuration.

## Server Health Logs

The Server Health Logs contain information to help identify and correct any Server failures and correlate hardware changes with Server failure. The Server Health Logs are stored in nonvolatile RAM and consist of the Critical Error Log and the Revision History Table.

If errors occur, information about the errors is automatically stored in the Critical Error Log.

Whenever boards or components (that support revision tracking) are updated to a new revision, the Revision History Table will be updated.

### Critical Error Log

The Critical Error Log records noncorrectable memory errors as well as catastrophic hardware and software errors that typically cause the system to fail. This information helps you quickly identify and correct the problem, minimizing downtime.

The log can be viewed through Inspect Utility, Diagnostics Utility, Compaq Insight Manager or the optional Server Manager/R. The Diagnostics Utility either resolves the error or suggests corrective action.

The Critical Error Log identifies and records all the following errors. Each error type is briefly explained below. When any of these errors are encountered, you should run the Diagnostics Utility.

**Table 3-18**  
**Critical Error Log Error Messages**

| Error Message   | Description   |
|---|---|
| <b>Automatic Server Recovery Base Memory Parity Error</b>     | The system detected a data error in base memory following a reset due to the Automatic Server Recovery (ASR) Timer expiration.                            |
| <b>Automatic Server Recovery Extended Memory Parity Error</b> | The system detected a data error in extended memory following a reset due to the ASR Timer expiration.  |
| <b>Automatic Server Recovery Memory Parity Error</b>          | The system ROM was unable to allocate enough memory to create a stack. Then, it was unable to put a message on the screen or continue booting the Server. |
| <b>Automatic Server Recovery Reset Limit Reached</b>          | The maximum number of system resets due to the ASR timer expiration has been reached, resulting in the loading of Compaq Utilities.                       |
| <b>Error Detected On Boot Up</b>                              | The Server detected an error during the Power-On Self-Test.   |
| <b>NMI - Expansion Board Error</b>                            | A board on the expansion bus indicated an error condition, resulting in a Server failure.   |
| <b>NMI - Expansion Bus Master Time-Out</b>                    | A bus master type expansion board in the indicated slot did not release the bus after its maximum time, resulting in a Server failure.                    |
| <b>NMI - Expansion Bus Slave Time-Out</b>                     | A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a Server failure.  |
| <b>NMI- Fail-Safe Timer Expiration</b>                        | Software was unable to reset the system fail-safe timer, resulting in a Server failure.   |
| <b>Processor Exception</b>                                    | The indicated processor exception occurred.   |
| <b>NMI- Processor Parity Error</b>                            | The processor detected a data error, resulting in a Server failure.   |
| <b>Server Manager Failure</b>                                 | An error occurred in the Server interface with the Server Manager/R.  |
| <b>NMI - Software Generated Interrupt Detected Error</b>      | Software indicated a system error, resulting in a Server failure.   |

### Revision History Table

Some errors can be resolved by reviewing changes to the Compaq ProLiant configuration. The Server has an Automatic Revision Tracking (ART) feature that helps you review recent changes to the Server's configuration.

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**3-56** *Diagnostic Tools*

One ART feature is the Revision History Table, which contains the hardware version number of the system board and any other EISA or PCI boards providing ART-compatible revision information. The Revision History is provided in the following format in Table 3-19.

| Table 3-19<br>Revision History Format |  |
|---------------------------------------|--|
|                                       | Values   |
| Functional Revision Level             | A to BC  |
| Assembly Version                      | 1 = Original Assembly<br>2 = Second Generation Assembly<br>3 = Third Generation Assembly<br>4 = Fourth Generation Assembly |

The Revision History Table is stored in nonvolatile RAM and is accessed through Diagnostics, Inspect, Compaq Insight Manager, and the optional Compaq Server Manager/R.

The Revision History Table feature allows precise identification of the components in a server. The table is updated when the system ROM detects a board version change in an EISA or PCI expansion slot. The table also contains complete version information on the previous configuration. This feature allows correlation of hardware changes with Server failure. The following information is stored in the Revision History Table:

- Type of board (System, EISA, or PCI)
  - Slot number
  - Expansion board ID
  - Version
-

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## System Configuration History Files

The System Configuration History Files, part of the ART feature, allow you to review modifications to the system configuration.

If a change has been made to the configuration file, the System Configuration Utility will keep a history of the system configuration file. The System Configuration Utility stores the three most recent configurations.

The most recent configuration of the System Configuration History Log can be displayed and printed using the Inspect Utility. All three versions can be printed for historical purposes or reinstalled through the Maintain Configuration Utility feature of the System Configuration Utility.

## ROMPaq

The use of flash ROM in the Compaq ProLiant and in certain options controllers allows the firmware (BIOS) to be upgraded with system or option ROMPaq utilities. To upgrade the ROM, insert the ROMPaq diskette into drive A and cold boot the system. The ROMPaq utility will then check the system and provide a choice (if more than one exists) of ROM revisions that the system can be upgraded to. This procedure is the same for both system and option ROMPaq utilities.



**CAUTION:** Do not turn the power off during a firmware upgrade. A loss of power during upgrade may corrupt the upgrade.

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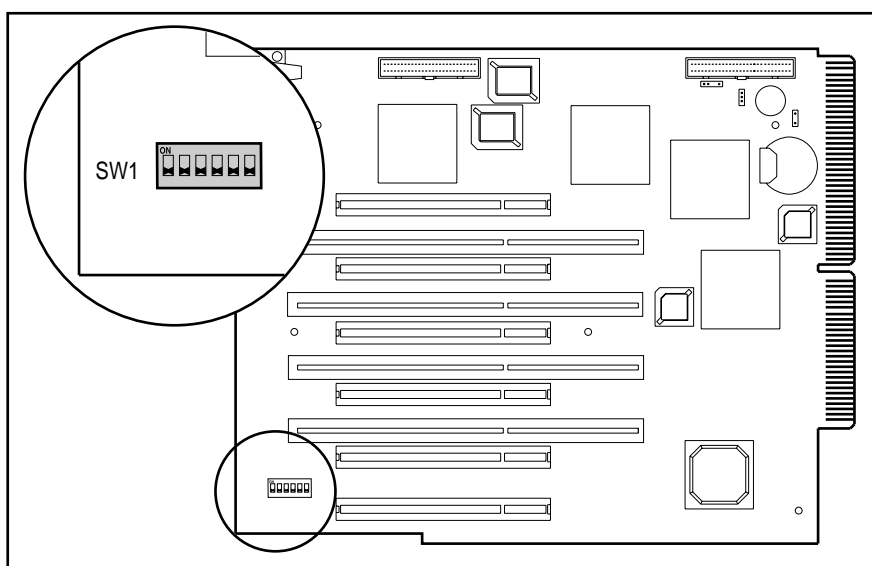
## Chapter 4

# Switch and Jumper Information

This chapter provides switch and jumper information for the Compaq ProLiant 2500 and 2500R Servers.

## System I/O Board

Switch SW1 is a six-position switchbank (S1-S6) that controls the security features and configuration of the computer.



**Figure 4-1.**Location of Compaq ProLiant 2500 and 2500R System I/O Board Switch

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## 4-2 Switch and Jumper Information

### SW1 - System Maintenance Switch

The following table defines the function for each switch setting of SW1. The default positions are indicated below.

| Table 4-1<br>System Maintenance Switch Settings - SW1 |                                     |   |   |
|---|-------------------------------------|---|---|
| Switch  | Function                            | Set to ON   | Set to OFF  |
| 1   | <b>Integrated Video Disable</b>     | Disables the integrated video controller.   | <i>Default.</i> Enables the integrated video controller.  |
| 2   | <b>Configuration Lock</b>           | Disables configuration changes.   | <i>Default.</i> Enables configuration changes.  |
| 3   | <b>Rack Mount Mode</b>              | <i>Default for Compaq ProLiant 2500R.</i> System is installed in a rack chassis.        | <i>Default for Compaq ProLiant 2500.</i> System is installed in a tower chassis.                    |
| 4   | <b>Diskette Boot Feature Enable</b> | Enables system booting from the diskette drive regardless of the configuration setting. | <i>Default.</i> System booting from the diskette drive is controlled by the configuration settings. |
| 5   | <b>Power-On Password Defeat</b>     | Clears passwords.   | <i>Default.</i> System booting is password protected if a password is set.                          |
| 6   | <b>Configuration Memory Clear</b>   | Clears the configuration memory.  | <i>Default.</i>   |

## Pentium Pro Processor Board

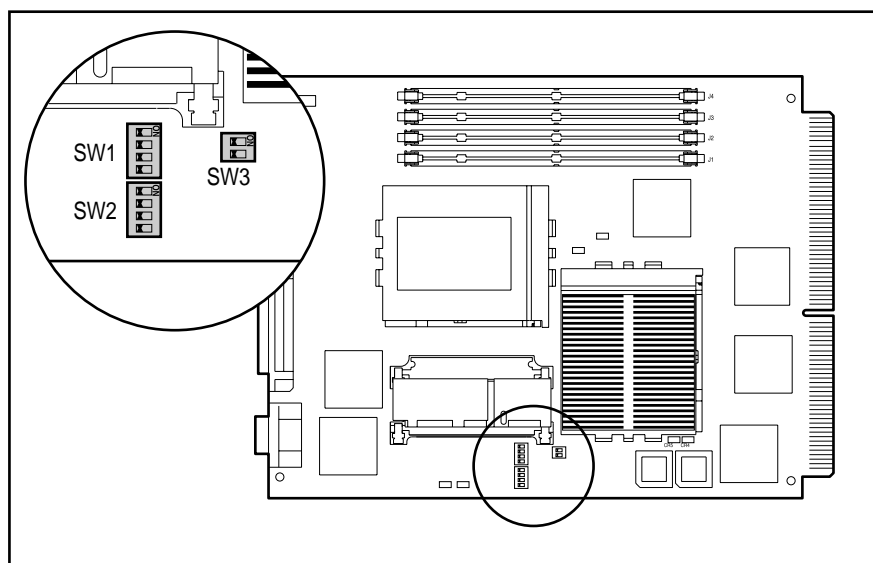
Three switchbanks, located on the Pentium Pro processor board, control the bus/core frequency ratio.



**CAUTION:** Setting the processor switchbanks incorrectly can result in permanent damage to the processor and/or data loss.



**CAUTION:** Processors on the same processor board **MUST** be installed in matched frequency.



**Figure 4-2.** Location of Pentium Pro Processor Board Switches

The following section defines the functions for switchbanks 1 to 3 on the processor board. The default positions are indicated in Table 4-2.



4-4 Switch and Jumper Information

SW1, SW2, SW3 - Bus/Core Frequency Ratio

Table 4-2  
SW1, SW2, SW3 - Bus/Core Frequency Ratio

| Bus/Core Ratio            | SW1 and SW2 |     |     |     | SW3 |     |
|---------------------------|-------------|-----|-----|-----|-----|-----|
|                           | 1           | 2   | 3   | 4   | 1   | 2   |
| 60 MHz/120 MHz            | ON          | ON  | ON  | ON  | ON  | OFF |
| 60 MHz/150 MHz            | ON          | ON  | ON  | OFF | ON  | OFF |
| 60 MHz/180 MHz            | ON          | ON  | OFF | ON  | ON  | OFF |
| 60 MHz/210 MHz            | ON          | ON  | OFF | OFF | ON  | OFF |
| 60 MHz /240 MHz           | ON          | OFF | ON  | ON  | ON  | OFF |
| 60 MHz /270 MHz           | ON          | OFF | ON  | OFF | ON  | OFF |
| 60 MHz /300 MHz           | ON          | OFF | OFF | ON  | ON  | OFF |
| 60 MHz /330 MHz           | ON          | OFF | OFF | OFF | ON  | OFF |
| 66 MHz /133 MHz           | ON          | ON  | ON  | ON  | OFF | ON  |
| 66 MHz /166 MHz           | ON          | ON  | ON  | OFF | OFF | ON  |
| 66 MHz /200 MHz (default) | ON          | ON  | OFF | ON  | OFF | ON  |
| 66 MHz /233 MHz           | ON          | ON  | OFF | OFF | OFF | ON  |
| 66 MHz /266 MHz           | ON          | OFF | ON  | ON  | OFF | ON  |
| 66 MHz /300 MHz           | ON          | OFF | ON  | OFF | OFF | ON  |
| 66 MHz /333 MHz           | ON          | OFF | OFF | ON  | OFF | ON  |
| 66 MHz /366 MHz           | ON          | OFF | OFF | OFF | OFF | ON  |

## SCSI Devices

The Compaq ProLiant 2500 supports both hot-pluggable and non-hot-pluggable SCSI hard drives. The Compaq ProLiant 2500R supports only hot-pluggable SCSI hard drives.

### Mass Storage for Hot-Pluggable Models

The Hot-Pluggable Fast-Wide SCSI-2 hard drive automatically sets the SCSI ID when plugged into the Compaq ProLiant 2500 Family of Servers. If the drives are part of a fault tolerant configuration, the replaced drive will automatically begin rebuilding when it is installed.

**NOTE:** It is not necessary to set the SCSI ID jumpers on a replacement drive. The SCSI ID is set automatically by the backplane board when the drive is installed.

The Integrated Wide-Ultra SCSI Controller requires that a SCSI ID be set for each SCSI device. The SCSI ID is set by jumpers ID2, ID1, and ID0 located on each SCSI device. Table 4-3 shows the jumper settings for each SCSI ID and its recommended drive bay. Figure 4-3 shows the physical locations of jumpers ID2, ID1, and ID0 on supported options.

**Table 4-3**  
**Jumper Settings for SCSI ID**

| Device in Drive Bay | SCSI ID | Bit 2<br>ID2 | Bit 1<br>ID1 | Bit 0<br>ID0 |
|---------------------|---------|--------------|--------------|--------------|
| 6                   | 6       | ON           | ON           | OFF          |
| 5                   | 5       | ON           | OFF          | ON           |

**NOTE:** SCSI IDs for bays 0-4 are preset to 0-4 respectively. No two devices can have the same SCSI ID.

4-6 Switch and Jumper Information

## Mass Storage for Duplexed Hot-Pluggable Models

Table 4-4 shows the jumper settings for each SCSI ID and its recommended drive bay. Figure 4-3 shows the physical locations of jumpers ID2, ID1, and ID0 on supported options.

| Table 4-4<br>Jumper Settings for SCSI ID |         |              |              |              |
|--|---------|--------------|--------------|--------------|
| Device in Drive Bay                      | SCSI ID | Bit 2<br>ID2 | Bit 1<br>ID1 | Bit 0<br>ID0 |
| 5  | 5       | ON           | OFF          | ON           |
| 4  | 4       | ON           | OFF          | OFF          |

**NOTE:** SCSI IDs for bays 0-3 are preset to 0-3 respectively. No two devices can have the same SCSI ID.

## Mass Storage for Non-Hot-Pluggable Models

The Integrated Wide-Ultra SCSI Controller requires that a SCSI ID be set for each SCSI device. The SCSI ID is set by jumpers ID2, ID1, and ID0 located on each SCSI device. Table 4-5 shows the jumper settings for each SCSI ID and its recommended drive bay. Figure 4-3 shows the physical locations of jumpers ID2, ID1, and ID0 on supported options.

| Table 4-5<br>Jumper Settings for SCSI ID |         |              |              |              |
|--|---------|--------------|--------------|--------------|
| Device in Drive Bay                      | SCSI ID | Bit 2<br>ID2 | Bit 1<br>ID1 | Bit 0<br>ID0 |
| 5  | 5       | ON           | OFF          | ON           |
| 4  | 4       | ON           | OFF          | OFF          |
| 3  | 3       | OFF          | ON           | ON           |
| 2  | 2       | OFF          | ON           | OFF          |
| 1  | 1       | OFF          | OFF          | ON           |
| 0  | 0       | OFF          | OFF          | OFF          |

**NOTE:** No two devices can have the same SCSI ID.

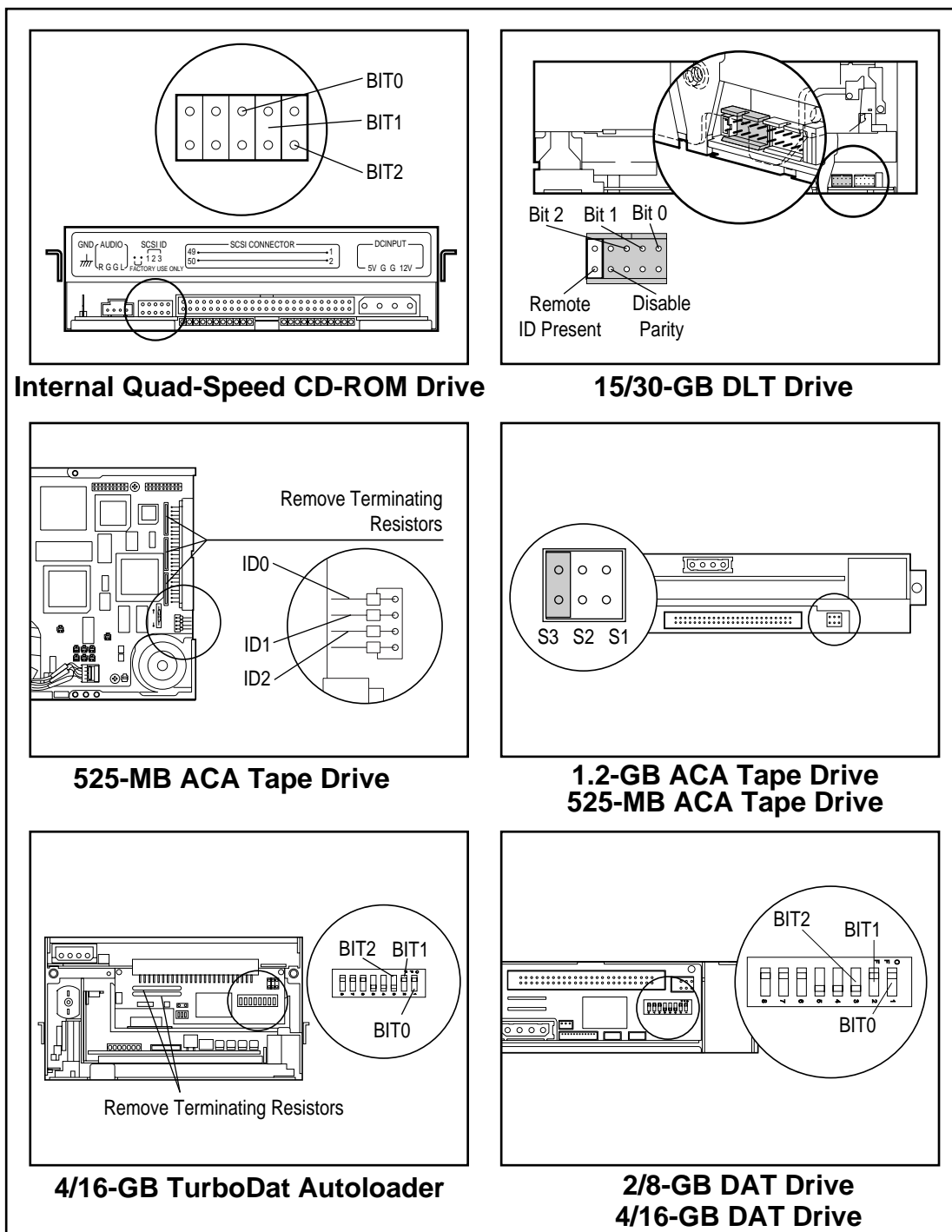


Figure 4-3. Supported SCSI Options Jumper Locations

## NetFlex-2 Controller

The Compaq NetFlex-2 Controller has one jumper block, which selects either Ethernet or Token Ring.

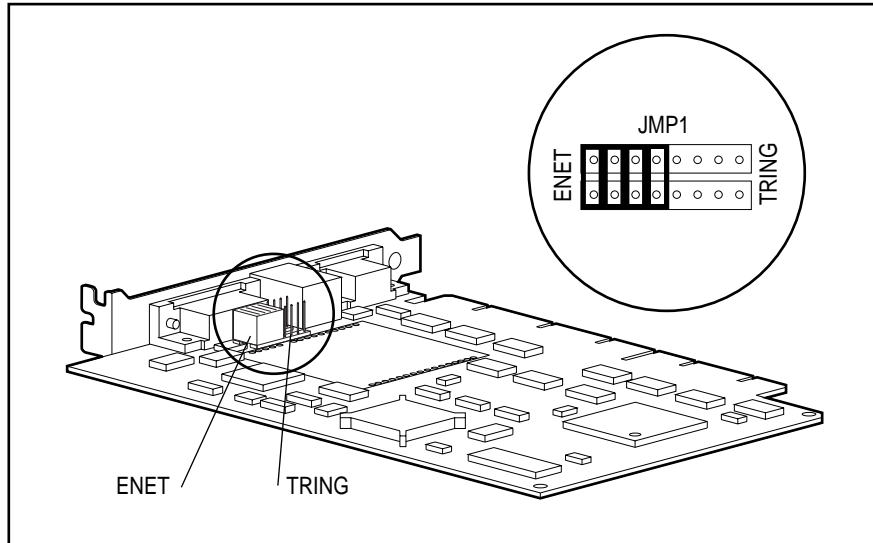


Figure 4-4. Location of 32-Bit NetFlex-2 Controller Jumpers for Ethernet

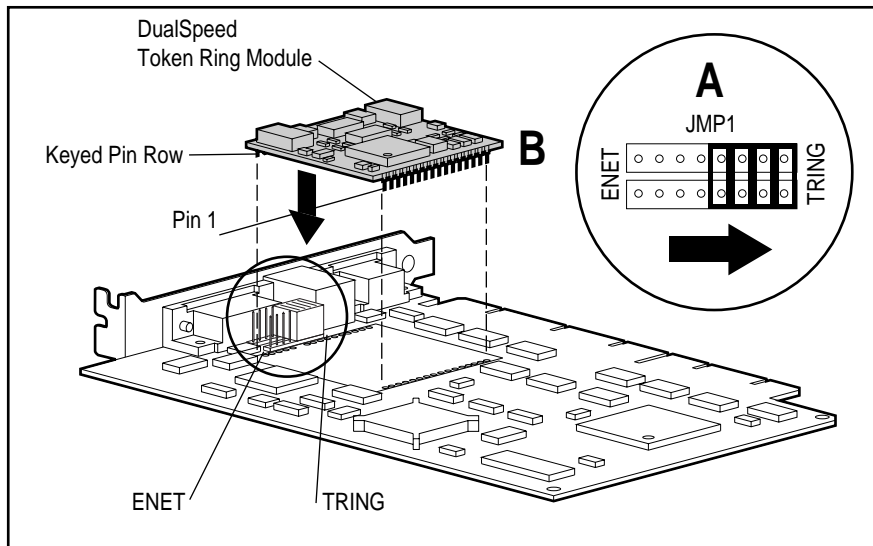


Figure 4-5. Location of 32-Bit NetFlex-2 Controller Jumpers for Token Ring

## **Chapter 5**

# **Physical and Operating Specifications**

This section provides operating and performance specifications for Compaq ProLiant 2500 and 2500R Servers and optional hardware.

- System Unit
- Power Supply
- Memory
- 19-Inch Rack
- Diskette Drives
- CD-ROM Drives
- Controllers
- Hard Drives
- Network Controllers
- Network Cabling

## System Unit

### Compaq ProLiant 2500

Table 5-1  
System Unit Specifications -  
Compaq ProLiant 2500

|                                   |                |               |
|-----------------------------------|----------------|---------------|
| Dimensions                        |                |               |
| Height                            | 17.92 in       | 45.52 cm      |
| Depth                             | 22.67 in       | 57.58 cm      |
| Width                             | 8.83 in        | 22.43 cm      |
| Weight                            |                |               |
| No Drives Installed               | 50.0 lb        | 22.68 kg      |
| Input Requirements                |                |               |
| Rated Input Voltage               | 100 to 240 VAC |               |
| Rated Input Frequency             | 50 - 60 Hz     |               |
| Rated Input Current               | 6 - 3 A        |               |
| Power Supply Output Power         |                |               |
| Rated Steady-State Power          | 325 W          |               |
| Maximum Peak Power                | 425 W          |               |
| Temperature Range                 |                |               |
| Operating                         | 50° to 95° F   | 10° to 35° C  |
| Shipping                          | -22° to 122° F | -30° to 50° C |
| Relative Humidity (noncondensing) |                |               |
| Operating                         | 8% to 90%      | 8% to 90%     |
| Nonoperating                      | 5% to 95%      | 5% to 95%     |
| Maximum Wet Bulb Temperature      | 101.7° F       | 38.7° C       |

## Compaq ProLiant 2500R

**Table 5-2**  
**System Unit Specifications -**  
**Compaq ProLiant 2500R**

|                                   |                |               |
|-----------------------------------|----------------|---------------|
| Dimensions                        |                |               |
| Height                            | 8.67 in        | 22.02 cm      |
| Depth                             | 22.75 in       | 57.78 cm      |
| Width                             | 19.0 in        | 48.26 cm      |
| Weight                            |                |               |
| No Drives Installed               | 50.0 lb        | 22.68 kg      |
| Input Requirements                |                |               |
| Rated Input Voltage               | 100 to 240 VAC |               |
| Rated Input Frequency             | 50 - 60 Hz     |               |
| Rated Input Current               | 6 - 3 A        |               |
| Power Supply Output Power         |                |               |
| Rated Steady-State Power          | 325 W          |               |
| Maximum Peak Power                | 425 W          |               |
| Temperature Range                 |                |               |
| Operating                         | 50° to 95° F   | 10° to 35° C  |
| Shipping                          | -22° to 122° F | -30° to 50° C |
| Relative Humidity (noncondensing) |                |               |
| Operating                         | 8% to 90%      | 8% to 90%     |
| Nonoperating                      | 5% to 95%      | 5% to 95%     |
| Maximum Wet Bulb Temperature      | 101.7° F       | 38.7° C       |



5-4 Physical and Operating Specifications

## Power Supply

Table 5-3  
Power Supply Specifications

|  |  |                                     |
|--|--|-------------------------------------|
| Input Specifications                                   |  |                                     |
| Nominal Line Voltage                                   | 100 to 120 VAC   | 220 to 240 VAC                      |
| Range Input Line                                       | 90 to 132 VAC  | 180 to 270 VAC                      |
| Frequency Range  | 47 to 63 Hz  | 47 to 63 Hz                         |
| Power Factor   | 0.95   | 0.95                                |
| Input Power  | 480 W  | 480 W                               |
| Input Current  | 4.0 at 120 VAC   | 2.0 at 240 VAC                      |
| Inrush Current   | 80 A at 132 VAC (cold start)   | 80 A at 264 VAC (cold start)        |
| Holdup Time  | 20 ms from zero crossing at 120 VAC  | 20 ms from zero crossing at 240 VAC |
| General Specifications                                 |  |                                     |
| Full Output Rating                                     | To 40°C and 5,000 ft   |                                     |
|  | To 32°C and 10,000 ft (derate linearly)  |                                     |
| Minimum Load   | 4.5 A on + 5V output; 0.4A on +12V output  |                                     |
| Ambient Temperature Range                              |  |                                     |
| Operating  | 50° to 122° F  | 10° to 40° C                        |
| Storage  | -40° to 149° F   | -40° to 65° C                       |
| Dielectric Voltage Withstand                           |  |                                     |
| Input to Output  | 3000 VAC/minute  |                                     |
| Input to Ground  | 1500 VAC/minute  |                                     |
| Safety Standard  | UL 1950; CSA 22.2 #950 or CSA 22.2 #234; TUV/VDE EN 60 950 (VDE0805/11.91); EMKO-TUE (74-SEC) 203/91                             |                                     |
| EMI  | 3 dB below CISPR Publication 22 Class B; 6 dB below BMPT - AmtsblVfg 243/1991 limits; 6 dB below CFR 47, Part 15 Class B limits. |                                     |
| Input Transient Susceptibility:                        |  |                                     |
| Common and Differential Mode (superimposed on AC line) | 2500V, 1 μs, damped sinusoid 600V, 10 μs pulse   |                                     |
| Differential Mode                                      | 20% step change in AC input voltage  |                                     |

## DIMM Memory

**Table 5-4**  
**DIMM Memory Specifications**

|   |                           |
|---|---------------------------|
| Size  | 32, 64, 128, 256 MB       |
| Speed   | 60 ns                     |
| Width   | 72 Bits                   |
| Upgrade Requirement   | Any pair of matched DIMMs |
| <b>NOTE:</b> Use only 32-, 64-, 128-, or 256-megabyte; EDO- or FASTPAGE-buffered; 4-K refreshed DIMMs. DIMMs must be 60-ns or faster. Use Compaq DIMMs or JEDEC-compliant DIMMs only. |                           |

## 19-Inch Rack

**Table 5-5**  
**19-Inch Rack Specifications**

|                          |                |           |
|--------------------------|----------------|-----------|
| <b>42U Rack</b>          |                |           |
| Dimensions               |                |           |
| Height (Total Cabinet)   | 85.30 in       | 216.66 cm |
| Height (Cabinet Opening) | 73.50 in (42U) | 186.69 cm |
| Depth                    | 33.50 in       | 85.09 cm  |
| Width                    | 24.00 in       | 60.96 cm  |
| Weight                   | 253 lb         | 114.84 kg |
| <b>22U Rack</b>          |                |           |
| Dimensions               |                |           |
| Height (Total Cabinet)   | 50.29 in       | 127.73 cm |
| Height (Cabinet Opening) | 38.50 in (22U) | 97.79 cm  |
| Depth                    | 33.50 in       | 85.09 cm  |
| Width                    | 24.00 in       | 60.96 cm  |
| Weight                   | 176 lb         | 79.89 kg  |

## Internal Diskette Drives

Table 5-6  
Internal Diskette Drives Specifications

|  | 1.44-MB (standard) |
|--|--------------------|
| Size   | 3 1/2-inch         |
| LED Indicators (front panel)                           | Green              |
| Read/Write Capacity per Diskette<br>(high/low density) | 1.44 MB/720 KB     |
| Drive Supported  | One                |
| Drive Height   | One-third          |
| Drive Rotation (rpm)                                   | 300                |
| Transfer Rate bits/sec (high/low)                      | 500 K/250 K        |
| Bytes/Sector   | 512                |
| Sectors/Track (high/low)                               | 18/9               |
| Tracks/Side (high/low)                                 | 80/80              |
| Access Times:  |                    |
| Track-to-Track (high/low)                              | 3 ms/6 ms          |
| Average (high/low)                                     | 169/94 ms          |
| Settling Time  | 15 ms              |
| Latency Average  | 100 ms             |
| Cylinders (high/low)                                   | 80/80              |
| Read/Write Heads                                       | Two                |

## CD-ROM Drive

**Table 5-7**  
**CD-ROM Drive Specifications**

|                                    |  |   |  |
|------------------------------------|--|---|--|
| Capacity                           |  | 680 MB or greater, dependent on disc format |  |
| Dimensions (excluding projections) |  |   |  |
| External                           |  |   |  |
| Height                             | 1.9 in                                   | 4.9 cm                                      |  |
| Depth                              | 1.3 in                                   | 3.3 cm                                      |  |
| Width                              | 7.01 in                                  | 17.8 cm                                     |  |
| Internal                           |  |   |  |
| Height                             | 1.7 in                                   | 4.3 cm                                      |  |
| Depth                              | 0.8 in                                   | 2.1 cm                                      |  |
| Width                              | 5.9 in                                   | 14.9 cm                                     |  |
| Weight                             |  |   |  |
| External CD-ROM                    | 6 lb 6 oz                                | 2.85 kg                                     |  |
| Internal CD-ROM                    | 1 lb 2 oz                                | 1.25 kg                                     |  |
| Data Transfer Rate                 |  |   |  |
| Sustained                          | 300 or 150 Kbytes/sec                    |   |  |
| Asynchronous                       | 2.5 MB/s                                 |   |  |
| Synchronous                        | 4.0 MB/s                                 |   |  |
| Access Times                       |  |   |  |
| Full Stroke                        | 520 ms                                   |   |  |
| One-Third Stroke                   | 290 ms                                   |   |  |
| Cache/Buffer                       | 256 Kbytes (minimum)                     |   |  |
| Audio Output Level                 |  |   |  |
| Line Out                           | 0.7 VRMS at 47 kohms                     |   |  |
| Headphone                          | 0.55 VRMS at 32 ohms (at maximum volume) |   |  |

## Tray Load CD-ROM Drive

**Table 5-8**  
**Tray Load CD-ROM Drive Specifications**

|                                    |  |          |
|------------------------------------|--|----------|
| Dimensions (excluding projections) |  |          |
| Height                             | 1 11/16 in   | 42.5 cm  |
| Depth                              | 8 in   | 202.4 cm |
| Width                              | 5 3/4 in   | 148.5 cm |
| Weight                             | 2 lb 12 oz   | 1.25 kg  |
| Laser Specifications               |  |          |
| Beam Divergence                    | 53.4° +/- 1.5°   |          |
| Output Power                       | 0.6 mW   |          |
| Type                               | Semiconductor laser GaAlAs                               |          |
| Wave Length                        | 780 nm   |          |
| Drive Performance                  |  |          |
| Access Time                        |  |          |
| One Third Stroke                   | 350 ms   |          |
| Full Stroke                        | 600 ms   |          |
| Audio Output Level                 |  |          |
| Line Out                           | 0.8 VRMS at 47 kΩ  |          |
| Headphone                          | 0.6 VRMS at 32 kΩ (maximum volume)                       |          |
| Cache/Buffer                       | 256 Kbytes   |          |
| Data Transfer Rate                 |  |          |
| Sustained                          | 300 or 150 Kbytes/sec                                    |          |
| Asynchronous                       | 2.5 MB/s   |          |
| Synchronous                        | 4.0 MB/s   |          |
| Interface Cable Length             | 6 m (approximately 18 ft maximum)                        |          |
| Reliability                        |  |          |
| Start Up Time                      | < 7 seconds  |          |
| Stop Time                          | < 3 seconds  |          |
| Environmental Conditions           |  |          |
| Operating                          |  |          |
| Temperature                        | 5° to 45° C  |          |
| Humidity                           | 10 to 90%  |          |
| Absolute Humidity                  | 30 grams/m <sup>3</sup> (maximum wet bulb temp is 29° C) |          |
| Atmosphere                         | Noncondensing  |          |
| Nonoperating/Transportation        |  |          |
| Temperature                        | -20° to 55° C  |          |
| Humidity                           | 5 to 90%   |          |
| Atmosphere                         | Noncondensing  |          |
| Power Requirement                  | 100-240 VAC, 50/60 Hz                                    |          |
| Power Consumption                  | 0.28 A   |          |

*Continued*

**Tray Load CD-ROM** *Continued*Environmental Conditions (*continued*)

|                |   |
|----------------|---|
| Shock          |   |
| Operating      | 5 G-O-P at 11 ms half sine wave                                   |
| Nonoperating   | 40 G-O-P at 11 ms half sine wave                                  |
| Transportation | 76 cm drop (with standard package)                                |
| Vibration      |   |
| Operating      | 0.15 G-O-P at 5 to 300 Hz   |
| Nonoperating   | 2 G-O-P at 5 to 300 Hz  |
| Transportation | 0.015 G <sup>2</sup> /Hz at 5 to 50 Hz<br>(with standard package) |

## Integrated Wide-Ultra SCSI Controller

**Table 5-9**  
**Wide-Ultra SCSI Controller Specifications**

|                         |                        |
|-------------------------|------------------------|
| Drives Supported        | Up to 5                |
| Data Transfer Method    | 32-Bit PCI bus master  |
| Host Bus Transfer Rate  | 132 MB/s               |
| SCSI Transfer Rate      | 40 MB/s                |
| External SCSI Connector | 68-pin Wide-Ultra SCSI |
| Internal SCSI Connector | 68-pin Wide-Ultra SCSI |

## Wide-Ultra SCSI Controller

**Table 5-10**  
**Wide-Ultra SCSI Controller**

|                                  |  |
|----------------------------------|--|
| Drives Supported                 | Up to 7 total (internal and external)                      |
| Data Transfer Method             | 32-bit bus master  |
| SCSI Channel Transfer Rate       | 40 MB/s  |
| Maximum Transfer Rate on PCI Bus | 132 MB/s   |
| SCSI Termination                 | Active termination   |
| External SCSI Connector          | 68-Pin wide SCSI Connector                                 |
| Internal SCSI Connector          | 50-Pin Fast-SCSI-2 Connector<br>68-Pin wide SCSI Connector |

## 32-Bit Fast-SCSI-2/E Controller

**Table 5-11**  
**32-Bit Fast-SCSI-2/E Controller Specifications**

|                                   |   |          |
|-----------------------------------|---|----------|
| Dimensions                        |   |          |
| Height                            | 4.5 in  | 11.43 cm |
| Depth                             | 0.375 in  | 0.95 cm  |
| Width                             | 10.5 in   | 26.67 cm |
| Total Weight                      | 7.13 oz   | 205 g    |
| Drives Supported                  | Up to 7 total (internal and external)                 |          |
| Data Transfer Method              | 32-bit bus master                                     |          |
| SCSI Channel Transfer Rate        | 10 MB/s   |          |
| Maximum Transfer Rate on EISA Bus | 33 MB/s   |          |
| SCSI Termination                  | Active termination                                    |          |
| External SCSI Connector           | 50-Pin SCSI-2 Connector                               |          |
| Internal SCSI Connector           | 50-Pin Port Connector<br>50-Pin Termination Connector |          |

## 32-Bit Fast-Wide SCSI-2/E Controller

**Table 5-12**  
**32-Bit Fast-Wide SCSI-2/E Controller Specifications**

|                                   |                                       |          |
|-----------------------------------|---------------------------------------|----------|
| Dimensions                        |                                       |          |
| Height                            | 4.5 in                                | 11.43 cm |
| Depth                             | 0.375 in                              | 0.95 cm  |
| Width                             | 10.5 in                               | 26.67 cm |
| Total Weight                      | 7.13 oz                               | 205 g    |
| Drives Supported                  | Up to 7 total (internal and external) |          |
| Data Transfer Method              | 32-bit bus master                     |          |
| SCSI Channel Transfer Rate        | 20 MB/s                               |          |
| Maximum Transfer Rate on EISA Bus | 33 MB/s                               |          |
| SCSI Termination                  | Active termination                    |          |
| External SCSI Connector           | 68-Pin wide SCSI Connector            |          |
| Internal SCSI Connector           | 50-Pin Fast-SCSI-2 Connector          |          |
|                                   | 68-Pin wide SCSI Connector            |          |

## 32-Bit Fast-Wide SCSI-2/P Controller

**Table 5-13**  
**32-Bit Fast-Wide SCSI-2/P Controller Specifications**

|                                  |                                       |
|----------------------------------|---------------------------------------|
| Drives Supported                 | Up to 7 total (internal and external) |
| Data Transfer Method             | 32-bit bus master                     |
| SCSI Channel Transfer Rate       | 20 MB/s                               |
| Maximum Transfer Rate on PCI Bus | 132 MB/s                              |
| SCSI Termination                 | Active termination                    |
| External SCSI Connector          | 68-Pin wide SCSI Connector            |
| Internal SCSI Connector          | 50-Pin Fast-SCSI-2 Connector          |
|                                  | 68-Pin wide SCSI Connector            |



## SMART-2/P Controller

**Table 5-14**  
**SMART-2/P Controller Specifications**

|   |                         |              |
|---|-------------------------|--------------|
| Dimensions  |                         |              |
| Height  | 3.9 in                  | 9.9 cm       |
| Length  | 13.75 in                | 34.9 cm      |
| Thickness (including Array Accelerator)           | 0.60 in                 | 1.5 cm       |
| Total Weight (including Array Accelerator)        | N/A                     | N/A          |
| Temperature Range                                 |                         |              |
| Operating   | 50° to 95°F             | 10° to 35°C  |
| Shipping  | -22° to 140°F           | -30° to 60°C |
| Relative Humidity (non condensing)                |                         |              |
| Operating   | 20% to 80%              | 20% to 80%   |
| Non-operating                                     | 5% to 90%               | 5% to 90%    |
| Power Required                                    |                         |              |
| +5V   | 2.6 amps                |              |
| +12V  | 20 ma                   |              |
| -12V  | 20 ma                   |              |
| Heat Dissipated (maximum)                         | 13.5 watts              |              |
| SCSI Channels                                     | 2                       |              |
| Drives Supported (maximum, internal and external) | 14                      |              |
| Data Transfer Method                              | 32-Bit bus master       |              |
| SCSI Bus Transfer Rate (maximum)                  | 20 MB/sec (10 MHz)      |              |
| PCI Bus Transfer Rate (maximum)                   | 132 MB/sec              |              |
| SCSI Bus Termination                              | Required                |              |
| SCSI Port Connectors (internal and external)      | 68-pin Fast-Wide SCSI-2 |              |

## SMART-2/E Controller

**Table 5-15**  
**SMART-2/E Controller Specifications**

|   |                         |              |
|---|-------------------------|--------------|
| Dimensions  |                         |              |
| Height  | 4.5 in                  | 11.4 cm      |
| Length  | 13.5 in                 | 34.3 cm      |
| Thickness (including Array Accelerator)           | 0.6 in                  | 1.5 cm       |
| Total Weight (including Array Accelerator)        | N/A                     | N/A          |
| Temperature Range                                 |                         |              |
| Operating   | 50° to 95°F             | 10° to 35°C  |
| Shipping  | -22° to 140°F           | -30° to 60°C |
| Relative Humidity (non condensing)                |                         |              |
| Operating   | 20% to 80%              | 20% to 80%   |
| Non-operating                                     | 5% to 90%               | 5% to 90%    |
| Power Required                                    |                         |              |
| +5V   | 3.0 a                   |              |
| +12V  | 20 ma                   |              |
| -12V  | 20 ma                   |              |
| Heat Dissipated (maximum)                         | 15.5 watts              |              |
| SCSI Channels                                     | 2                       |              |
| Drives Supported (maximum, internal and external) | 14                      |              |
| Data Transfer Method                              | 32-Bit Bus Master       |              |
| SCSI Bus Transfer Rate (maximum)                  | 20 MB/sec (10 MHz)      |              |
| EISA Bus Transfer Rate (maximum)                  | 33 MB/sec               |              |
| SCSI Bus Termination                              | Required                |              |
| SCSI Port Connectors (internal and external)      | 68-pin Fast-Wide SCSI-2 |              |

## SMART SCSI Array Controller

Table 5-16  
SMART SCSI Array Controller Specifications

|                                      |  |
|--------------------------------------|--|
| Drives Supported                     | Up to 14                               |
| Data Transfer Method                 | 32-Bit Bus Master                      |
| Maximum Transfer Rate on EISA Bus    | 33 MB/s                                |
| Simultaneous Drive Transfer Channels | 2                                      |
| Reliability Features                 |  |
| Drive Mirroring                      | Yes                                    |
| Data Guarding                        | Yes                                    |
| Distributed Data Guarding            | Yes                                    |
| N+1 Distributed Data Guarding        | Yes                                    |
| On-Line Spare                        | Yes                                    |
| Drive Failure Alert System           | LED Indicators, Compaq Insight Manager |
| Cache Memory for Accelerator         | 4 MB Mirrored                          |
| Batteries                            | Yes                                    |
| Battery Capacity without Power       | 3 - 4 days                             |
| Charge                               | Trickle                                |

## 2.1-Gigabyte Pluggable Fast-Wide SCSI-2 Drive

Table 5-17  
2.1-Gigabyte Pluggable Fast-Wide SCSI-2 Drive Specifications

|                      |                               |
|----------------------|-------------------------------|
| Capacity             | 2104.3 MB                     |
| Block Size           | 512 Bytes                     |
| Interface            | Single-Ended Fast-Wide SCSI-2 |
| Synchronous Transfer | Up to 20 MB                   |
| Buffer Size          | 256 Kbytes                    |
| RPM                  | 7200 rpm                      |
| Average Access       | 9.0 ms                        |

## 4.3-Gigabyte Pluggable Fast-Wide SCSI-2 Drive

**Table 5-18**  
**4.3-Gigabyte Pluggable Fast-Wide SCSI-2 Drives Specifications**

|                      |                               |
|----------------------|-------------------------------|
| Capacity             | 4293.6 MB                     |
| Block Size           | 512 Bytes                     |
| Interface            | Single-Ended Fast-Wide SCSI-2 |
| Synchronous Transfer | Up to 20 MB                   |
| Buffer Size          | 512 Kbytes                    |
| RPM                  | 7200 rpm                      |
| Average Access       | 9.0 ms                        |

## NetFlex-2 ENET-TR Controller

**Table 5-19**  
**NetFlex-2 ENET-TR Controller Specifications**

|  |                               |         |
|--|-------------------------------|---------|
| Dimensions   |                               |         |
| Height   | 5.1 in                        | 12.9 cm |
| Depth  | 7.4 in                        | 18.8 cm |
| Width  | 0.51 in                       | 1.3 cm  |
| Total Weight   |                               |         |
| Ethernet Configuration                                 | 5.44 oz                       | 150 g   |
| Token Ring Configuration                               | 5.76 oz                       | 170 g   |
| Processor  | TI TMS380C26                  |         |
| Coprocessor  | TI Packet Blaster (TMS380FPA) |         |
| Data Transfer Method                                   | 32-bit EISA bus master        |         |
| Maximum Transfer Rate on EISA bus                      | 933 MB/s                      |         |
| Standard Network Controller Configuration - Ethernet   |                               |         |
| Meets IEEE 802.3 Specifications                        |                               |         |
| Supports AUI (DB-15)                                   |                               |         |
| Supports 10BaseT (RJ-45)                               |                               |         |
| Supports Optional AUI to BNC Adapter                   |                               |         |
| Optional Network Controller Configuration - Token Ring |                               |         |
| Meets IEEE 802.5 Specifications on STP cable           |                               |         |
| Meets proposed specifications on STP cable             |                               |         |
| Supports Token Ring Interface                          |                               |         |
| (4- or 16-megabit per second data transfer rates)      |                               |         |
| Supports STP (DB-9)                                    |                               |         |

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**5-16** *Physical and Operating Specifications*

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Supports UTP (RJ-45)

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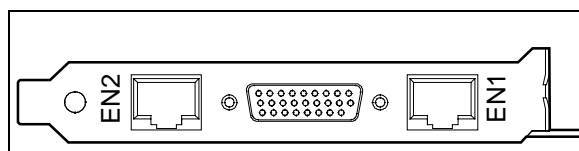
## NetFlex-3/E Controller

**Table 5-20**  
**Compaq NetFlex-3/E Controller Specifications**

|                            |                           |         |
|----------------------------|---------------------------|---------|
| Dimensions                 |                           |         |
| Height                     | 0.75 in                   | 1.91 cm |
| Length                     | 8.2 in                    | 20.7 cm |
| Width                      | 5.0 in                    | 12.7 cm |
| Total Weight               | 5.76 oz                   | 159 g   |
| Network Controller Chipset | TI ThunderLAN             |         |
| Data Transfer Method       | 32-Bit EISA Bus master    |         |
| Interrupts Supported       | 5, 9, 10, and 11          |         |
| LEDs                       | Link and Network Activity |         |

## Netflex-2 DualPort ENET Controller

Both network interfaces share a common 26-pin D-Shell connector to support AUI. To convert this connector to two AUI ports, a special cable (that ships with the option) is required.



**Figure 5-1.**D-Shell Connector

**Table 5-21**  
**NetFlex-2 DualPort ENET Controller Specifications**

|                      |   |
|----------------------|---|
| Network Interface    | Two Ethernet interfaces on a single controller card                   |
| Expansion Bus        | 32-Bit Extended Industry Standard Architecture (EISA)                 |
| Data Transfer Method | 32-Bit Bus Master   |
| Network Bit Rate     | 10 Mbits/sec  |
| Connectors           | Two RJ-45 connectors and two AUI or BNC connections (converter cable) |
| Processor            | Texas Instruments TMS380C26 Super Eagle                               |
| Coprocessor          | Texas Instrument Packet Blaster TMS380FPA                             |

## Ethernet Cable (10/100BASE-T)

**Table 5-22**  
**Ethernet Cable Specifications Twisted Pair (10/100BASE-T)**

|                 |  |
|-----------------|--|
| Connector type: | RJ-45, 8-pin   |
| Cable type:     | Unshielded twisted pair (UTP)<br>22-26AWG, 100 Ohm @ 1 MHz |
| Distance:       | Up to 100 meters from node to concentrator                 |

## Ethernet Cable (AUI)

**Table 5-23**  
**Ethernet Cable Specifications (AUI)**

|                 |  |
|-----------------|--|
| Connector type: | DB-15  |
| Cable type:     | AUI cable to external transceiver  |
| Distance:       | Up to 50 meters between network controller and the<br>Medium Attachment Unit (MAU) |

## Token Ring Cable (STP)

**Table 5-24**  
**Token Ring Cable Specifications Shielded Twisted Pair (STP)**

|                 |   |
|-----------------|---|
| Connector type: | DB-9  |
| Cable type:     | All cable types that meet the IEEE 802.5 requirements |

## Token Ring Cable (UTP)

**Table 5-25**  
**Token Ring Cable Specifications Unshielded Twisted Pair (UTP)**

|                 |   |
|-----------------|---|
| Connector type: | RJ-45   |
| Cable type:     | All cable types that meet the IEEE 802.5 requirements |

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